JUNE
19
1959

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

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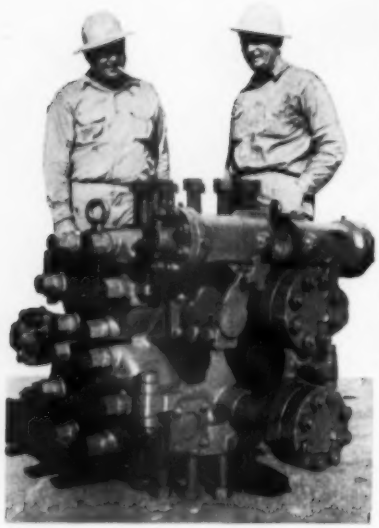

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DEPT/Opinions

Views That Make News

Dear Sir:

I hope PETROLEUM WEEK will correct an erroneous impression created by the editing of the statement of Charles S. Jones, president, Richfield Oil Corp. of Los Angeles, in the "Centennial Forecast" issue [PW—May15'59,p100]. The last sentence of the statement as published reads, "It is estimated that California production [from recoverable reserves of approximately 4-billion bbl. at Jan. 1, 1958] will have dwindled to 400,000 b/d by the end of 1968, compared with 939,000 b/d in 1958."

However, Mr. Jones' full statement continued: "But revisions and extensions of those reserves, plus discoveries both onshore and offshore, should bring California production to approximately 1,050,000 b/d at the end of 1968 . . ."

COLIN W. GRAVES
Richfield Oil Corp.
Los Angeles

• Editor's Note: We regret the editing, done for space reasons, that had Mr. Jones predicting a 1968 California production of 400,000 b/d, instead of the 1,050,000 b/d he actually forecast.

Dear Sir:

In your "Views That Make News" [PW—May29'59,p6], W. Harold Rea, president of Canadian Oil Cos., makes a statement that . . . "Canadian oil is the only oil which can reach the U.S. in time of war without traveling through submarine-infested waters."

Now Mr. Rea probably knows that most everybody does recognize that we Texans claim the biggest and largest of most everything. But tell him that we do not claim that the Rio Grande, which separates Texas from Mexico, is large and deep enough to permit the operation of submarines.

Therefore, we believe that his statement should be corrected so as to include the oil and gas that is available from Mexico and which is now, to a certain extent, piped from Mexico to the U.S.

I wish to state again, as I have previously, that I do think you have a wonderful oil magazine here.

HARRY E. ALLEN
Corpus Christi, Tex.

Dear Sir:

We hold various interests with other oil producers in several areas of the Rocky Mountains. All of this production has been affected, at times in the past, by the oil import policies of the federal government. We have lived with these policies, while not agreeing with all of them. However, we feel that the latest one, that of mandatory import controls, if continued, will wreak the ultimate damage to the domestic oil industry and the future national security.

Certainly the oil reserves of the North American continent are not inexhaustible, and while it . . . will be perhaps 200 years before any real shortage exists, it will eventually arrive.

It must be apparent to all that, due to U.S. global policy, including encouragement of tremendous private investments, we have practically forced countries such as Venezuela, Canada, Iran, Kuwait, and various smaller nations to base their future hope for an increasing living standard—and hence political stability and a respected position in the free society of nations—primarily on the development of an export oil position.

To summarily and abruptly damage and, in some cases, destroy this position can only react to the detriment of this country on a world-wide scale at a time when we can ill afford any increase in antagonisms. The day will arrive when we must import oil to survive, and it seems foolish to ignore this fact and, by our latest action, to place ourselves in a position of telling the world that we do not care to help these nations help themselves.

Would it not make more sense for the federal government to work out a deal, on a rental, royalty, or purchase agreement, with the owners of some of the old depleted fields which are near pipeline terminals on the East, West, and Gulf coasts of the U.S., and purchase and place in storage in these old fields enough of the oil from these friendly foreign nations to enable them to maintain their climb up the social and economic ladder?

BILL CLARK
President
Kent Drilling Co.
Salt Lake City

PETROLEUM WEEK *will publish each week comments from readers on timely, pertinent subjects. Such expressions are welcome.*

Address all such correspondence to LeRoy Menzing, Editor, PETROLEUM WEEK, *330 W. 42nd St., New York 36, N.Y.*

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A McGRAW-HILL PUBLICATION

PETROLEUM WEEK **June 19, 1959**
Vol. 8, No. 25

Published weekly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), founder. Publication office: 871 N. Franklin St., Chicago 10, Ill. See panel below for directions regarding subscriptions or change of address.

Executive, Editorial, Circulation and Advertising offices: 330 W. 42nd St., New York 36, N. Y. Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice President; L. Keith Goodrich, Vice President and Treasurer; John J. Cooke, Secretary. Officers of the Publications Division: Nelson L. Bond, President; Harry L. Waddell, Senior Vice President; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator.

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Subscriptions: Address subscription correspondence and change of address to Fulfillment Manager, Petroleum Week, 330 W. 42nd St., New York 36, N. Y. On address changes please give old and new addresses and zone numbers, if any, and enclose an address label from a recent issue if possible. Please allow one month for change to become effective.

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INSIDE *Slant*

IMPORTS ABOVE '58 LEVEL

While the control plan reduces total oil imports into the U.S. appreciably, crude imports this year probably will exceed those of 1958.

In fact, total imports may surpass the 1958 level.

But there is a good reason for this: the flood of product imports into the country before the mandatory program was put into effect.

During the first quarter of 1959, total imports averaged 2,217,000 b/d. Of this total, 958,000 b/d were crude and 932,000 b/d were residual.

The product level has been pulled down considerably since the effective date of the mandatory program, but there has been little change in crude.

Crude imports in the second quarter are averaging around 900,000 b/d, and may exceed 1-million b/d for the rest of 1959, for a yearly average of 965,000 b/d. The average in 1958 was 953,000 b/d.

The crude level is high because of exemptions.

Total imports should be around 1,725,000 b/d this year, compared with the 1958 average of 1,695,000 b/d.

LeRoy Menzing
EDITOR

REPEAT BUSINESS...

Commendation of Performance

Creole Petroleum Corporation of Venezuela, one of the world's largest producers of crude oil, has pursued a dedicated course of conservation and maximum utilization of Venezuela's natural resources. In so doing, complex engineering problems in gas injection have been created.

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Evidence that the client was pleased with this $20 million project came when Brown & Root was awarded a contract to design and construct Conservation Plant Tía Juana Two of 84,000 horsepower, and then again Brown & Root was successful in obtaining the design and construction contracts for Tía Juana Plant Three of 98,000 horsepower. Conservation Plant Bachaquero One, Creole's fourth repressuring station, is currently on Brown & Root's drawing boards.

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60-Second Summary / WHAT'S HAPPENING IN OIL

AT-A-GLANCE PETROLEUM WEEK

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June 19, 1959

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Cost reduction is still the major target of producers. The determined efforts to find more economic operating techniques and equipment for producing oil and gas is the subject of a Special Report. . . . p. 46

•

A congressman and three administrators are the key men to watch in Washington. Percentage depletion, gas regulation, and oil prices are their primary concern. . . . p. 14

•

A waterflood program involving lease automation is succeeding in a 53-year-old Oklahoma field. The area involves 408 unitized acres on the eastern edge of the Delaware-Childers field, in Nowata County. . . . p. 21

•

Boosting refinery runs to get a higher import allocation isn't worth the economic risks, according to Imports Administrator Carson. His view that mandatory controls benefit producers was challenged by a North Dakota official this week. . . . p. 11

•

Injection of magnesium salts shows some promise toward solving corrosion in boilers fired with residual fuel. It is one of the many additives being tried in a search for an economic solution to corrosion due to fuel contaminants. . . . p. 73

•

Renewed interest is mounting in the Harding County (S. D.) portion of the Williston Basin. The area has had three discoveries so far in 1959. . . . p. 29

•

The waste-treating plant at Cities Service's new Ontario refinery feeds water to an aquarium. It used a biological process, based on bacterial action on chemicals. . . . p. 76

•

The Hassi Messaoud field in the French Sahara is being turned into a showplace—a symbol of French oil independence. It is becoming the most modern oil camp in the world. The French government owns half of the field's reserves. It hopes the Sahara eventually will supply not only France's needs but Europe's as well. . . . p. 80

•

Diesel taxicabs in growing numbers on city streets have marketers thinking. The more efficient engine means less consumption of a lower-valued fuel. . . . p. 92

•

Natural gasoline producers face a real problem. There is a growing demand for their material by petrochemical processors. But since natural gasoline is classified as a motor fuel, all potential processors cannot be exempted from federal gasoline taxes. . . . p. 13

Up to the Minute / SIGNIFICANT LATE NEWS

June 19, 1959

A second week of refinery runs in excess of 8-million b/d, in the face of surplus product stocks, darkens the producer's outlook. Amid reports of some crude being offered at discounts, many industry observers say tight allowables may be needed through September. Reduction in crude production is now necessary they say, to force cutbacks in refinery runs to avoid widespread reductions in refined product prices.

•

A fight on percentage depletion may hit the Senate soon. Antidepletionists are gathering strength to make another stab at cutting the percentage when a bill extending the so-called Korean War excise taxes comes up for a vote, probably next week.

Last August, depletion's opponents mustered 31 votes on an amendment to a minor tax bill to reduce the 27.5% provision to a graduated scale. Now, they talk of 40-odd votes.

•

Esso Standard Oil Co., which had a loss of $6.2-million in 1958, expects "brighter" results this year. William Naden, president of the refining and marketing affiliate of Jersey Standard, said Esso's four-month net this year was $16-million, compared with a loss of $7.5-million in the same period last year. Gross through April totaled $702-million, up 17%.

•

With U.S. import exemptions, Canadian crude exports should top 100,000 b/d in 1959, E. D. Brockett, president of British American Oil Co., Ltd., predicted this week. "Nominations for western Canadian crude by U.S. refiners have already shown a considerable increase," he said, adding: "Canadian crude has a competitive advantage over U.S. crude in the Puget Sound and north central areas." U.S. imports from Canada were 83,000 b/d in 1958.

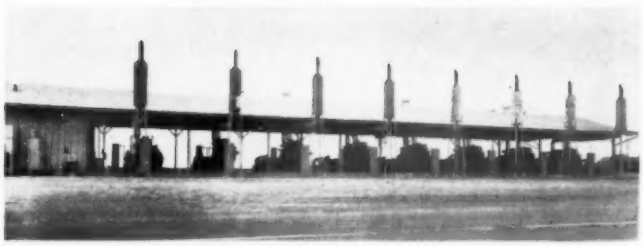
Some oil companies are asking for proration of crude in Saskatchewan—a move to stop discounted sales in the Upper Midwest. About 60% of the 67,000 b/d of Canadian oil entering the area comes from Saskatchewan, which, unlike Alberta, has no proration. Sales have been made at 11¢ to 17¢ a bbl. below U.S. delivered prices.

•

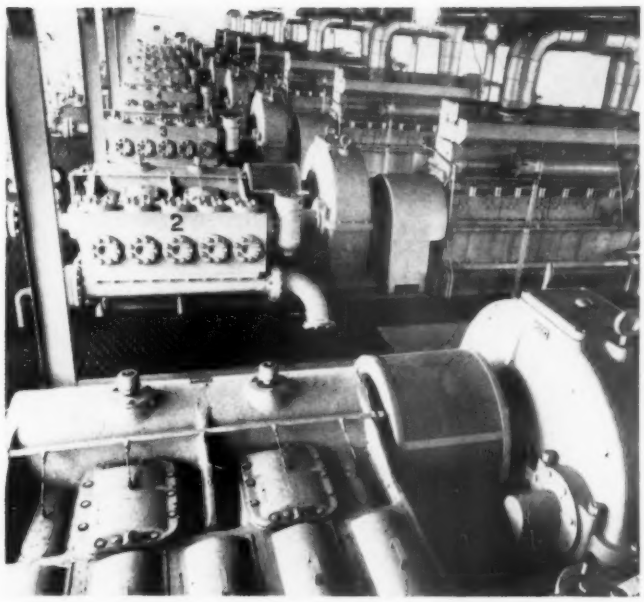
U.S. mineral leasing rules may be eased considerably. Congress is taking swift action on a bill to boost the maximum holdings in Alaska to 1-million acres—the same as on state lands. And in the other states, Sen. Joseph C. O'Mahoney (D., Wyo.) wants the maximum lease and option holdings increased to 246,080 acres. At present, only 46,080 acres can be held under lease and an additional 100,000 acres under option on federal lands in any one state.

•

Western Natural Gas Co., owned 19% by El Paso Natural, will become a fully integrated company. It has contracted to buy Premier Oil & Refining Co. properties from City Products Corp. for $8,850,000.



They're actually pumping the ocean . . .



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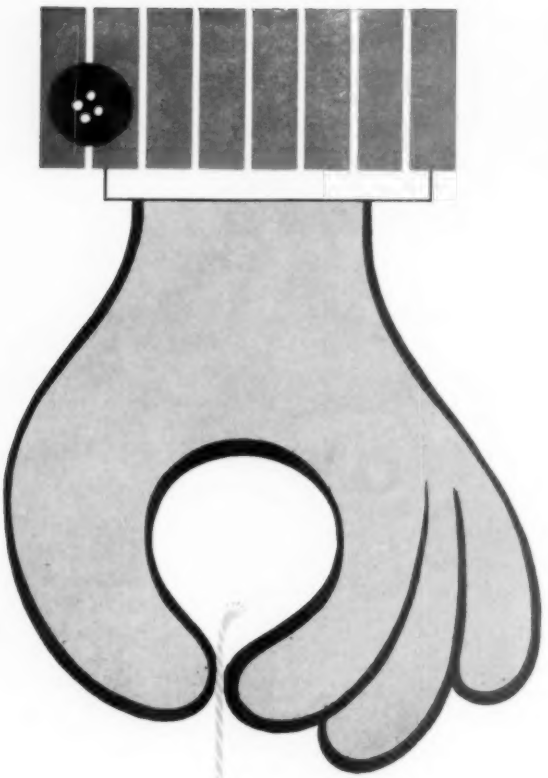

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Carson: A Boost in Runs Is Risky

A medium-sized refiner who hikes crude runs above "normal" in order to get a higher import allocation would have to process 15 bbl. of domestic oil for each extra barrel of import allocation that may be granted.

Such a procedure was characterized by Imports Administrator Matthew V. Carson, Jr., as "economic nonsense"—a term he has used previously in response to critics who say the method of imports control causes high runs.

Speaking at the midyear meeting of the Interstate Oil Compact Commission in New Orleans this week, Carson used as an example a refiner in the area east of the Rockies "normally" operating at 35,000 b/d.

If runs were boosted by 5,000 b/d for a six-month period, Carson said, that refiner would be entitled to a maximum extra allocation of 225 b/d in the January-June period of 1960, under the existing refinery-run formula for setting quotas.

And if the runs were kept 5,000 b/d higher for a year, the refiner would be eligible for an extra allocation of 450 b/d in the last half of 1960, he added.

The extra imports quota would amount to 123,000 bbl., Carson noted, which would require processing "an additional 1,825,000 bbl. of domestic crude over and above normal operation—a ratio of 15-to-1."

For larger refiners, the disproportion between the added domestic crude run and the resultant increase in imports allocation is even greater, Carson commented, since the percentage of imports gets smaller on higher runs.

An increase in runs just to get higher allocations means that refiners either have to expand their markets or increase storage capacity, Carson said.

The hypothetical 35,000 b/d refiner in Districts I-IV who jumped to 40,000 b/d, Carson explained, would have to develop a market for almost 2-million bbl. in a year's time, or increase storage to handle the extra output of the plant.

"Now what has been gained?" Carson asked. "Capital, borrowed or otherwise, has been tied up. Storage facilities may have been filled and additional space leased."

Regardless of how refiners may try to "manipulate" runs for higher allocations, the over-all governing factor on import quotas is demand.

Any refiner, Carson noted, will find that allocations will be lowered during periods of declining demand, despite high runs.

"I do not believe that any refiner—independent or major—could remain in business on this basis [of unnecessary high runs]. Sustained activity of this sort would mean fewer importers, not more imports," he observed.

Gearing imports to refining capacity would provide static maximum import quotas, Carson predicted.

An individual refiner, he said, would receive the same quantity of foreign oil whether he operated his plant at 50%, 5%, or even 1% of capacity.

"Then, too," he added, "I doubt if anyone would like to have the job of determining what the capacity of a given refinery was. If you make a satisfactory determination, I doubt if your findings would agree with the claims of the owner—unless, that is, you happen to be both judge and jury."

But no matter whether import allocations are based on runs or on

Esso's Libya Well Rated at 17,500 b/d

This is Esso Standard (Libya)'s Zelten discovery, completed last week as a producer rated by the company at 17,500 b/d. The well tested 37-gravity oil from a limestone section between 5,460-665 ft., with a tubing pressure of 200 psi. and a casing pressure of 700 psi. Oil men are saying it has "Middle East flavor."

The well, in concession No. 6, Cyrenaica, is about 100 mi. from the Mediterranean (PW—Apr.24'59,p69). It offers hope of setting up another North African supply of oil for Western Europe—oil that does not have to pass through the Suez Canal. The wildcat was Esso's fourth in Cyrenaica; the first three were dry. The company is now planning to bring in another rig to help outline the field.

Esso holds some 25-million acres of concessions in Libya, and has already spent $25-million in exploration there. It is also currently drilling its 11th wildcat in the Fezzan—the No. 1 El Hadt, near the Algerian border. The company has had numerous oil and gas shows in that area, notably its No. 2 Atshan, which found the first oil show in Libya. It tested 500 b/d of 47-gravity oil.

capacity, the mandatory control program is "killing" the North Dakota oil industry, a state official charged.

In fact, Clarence B. Folsom, Jr., chief petroleum engineer of the North Dakota Geological Society, said at the IOCC meeting that the President "couldn't have picked a better way to kill the oil industry" in his state.

North Dakota, in Folsom's opinion, is a good laboratory to "test" the control program—being the only state with competition from four major producing areas.

He listed those as Middle East oil coming through the St. Lawrence Seaway, Venezuelan oil moving up the Mississippi River, Canadian crude (which is exempt from strict controls) coming through pipelines, and domestic crude from Kansas and Illinois.

Production and drilling in North Dakota have dropped as a result of mandatory import controls.

Folsom said that drilling has dropped 20% in the past six months. And so far this year, only three discoveries have been made in North Dakota, compared with eight last year.

"In July," Folsom said, "we will be marketing 50,000 b/d out of a production potential of 132,000 b/d."

Folsom said that operators are beginning to plug producing wells, and predicted that the state will have a net loss in crude reserves this year.

He added: "Maybe the [import] program is working. But not for us, for somebody else."

Folsom's charge was in sharp contrast to Carson's comment that the mandatory program geared to refinery runs and demand gives "assurance" that foreign oil will not supplant domestic supplies.

The only action on imports by IOCC itself was to put its Committee to Study the Effect of Oil Imports on State Conservation Programs on a standby basis. The group will be available to make such studies as the Executive Committee of the Compact may suggest in the future.

Curtailing Waterfloods Takes Caution

There's no pat way to determine how curtailments of various kinds affect the efficiency and economics of waterflood production, according to Walter Rose, professor of petroleum engineering at the University of Illinois.

Contradictory and inconclusive results appear to be the rule insofar as this question is concerned, he told the midyear meeting of the Interstate Oil Compact Commission in New Orleans.

Curtailments are interruptions of production due to either shut-in periods, or proration controls on production. But no matter what the cause, says Rose, these questions arise: Is it wise to limit water injection rates and oil production rates? Is there a loss of ultimate oil recovery when production is interrupted periodically?

"This is an ever-challenging problem because it is never certain that the best answer has been found in any particular, practical case," he added.

For example, he noted, if mathematical and analog computational methods are used, they generally require introduction of "simplifying assumptions" before solutions are possible. It may be necessary in such approaches to approximate the reservoir size and shape, or to neglect gravity and/or capillary forces.

Field experiments may be inconclusive because of the inherent difficulty in making accurate field measurements, Rose reported. And it may be impractical to wait for completion of the field experiment, which might take "tens of years," he said.

"Such reasons explain why, even today, reservoir engineers know too little about how to propose systematically the MER for a particular field case, with full assurance that the advocated operating plan will yield the maximum efficient rate from which the maximum profit is realized," Rose said.

Some engineers cite field and laboratory data which seem to indicate that interruptions in production cause a loss in oil recovery.

The Illinois engineer said that these authorities conclude that, since waterflooding is frequently a marginal operation, no restrictions should be placed which will increase operating costs or delay the return on investment.

Other engineers, however, use comparable field and laboratory data which seem to indicate, if anything, that curtailments are desirable.

These engineers believe, said Rose, that such curtailments increase the total amount of oil which ultimately can be produced by waterflooding.

Rose added that this group, therefore, advocates voluntary and/or mandatory proration in waterflood operations as a matter of conservation—implying that, in the long run, profits are thereby increased.

In special cases, both of these conflicting approaches can be correct. This is so because oil recovery by waterflooding is influenced by rate.

Rose, who made a theoretical study of the problem for the Illinois Geological Survey in 1958, concluded that the recovery process is controlled by as many as three major driving forces—gravity, hydrodynamic, and capillary—which may act together or in opposition.

When rate is changed, or when production is interrupted, he continued, the resultant of the three controlling forces changes, thus influencing the recovery rate.

"Elementary consideration," he said, shows that gravity forces are independent of rate, while hydrodynamic forces are directly proportional to rate.

Capillary forces, on the other hand, may or may not depend on rate.

Curtailments must, therefore, be carefully programmed, else recoverable oil will be lost, Rose warned.

He suggested that each field operation be separately considered before specific controls are adopted.

In some cases, Rose noted, low rates —as determined by the relative magnitude of and the nature of the interplay between the three driving forces —are desirable when the injected water is less viscous than the replaced oil. Low rates help to flush oil out of tight sand lenses and out of the unswept portion.

Boys Ranch Gets Aid

Six companies are cooperating to provide sufficient heat for the Boys Ranch, at Tascosa, in the Texas Panhandle.

A 2-in., 7½-mi. gas line laid by Phillips Petroleum Co. and Shamrock Oil & Gas Corp. years ago as a gift is now inadequate.

So Phillips and Shamrock will lay a 4-in. line, costing about $60,000 to the boys' haven.

Tex-Tube, Inc., is supplying pipe at an extra discount, and three transporters—C & H Transportation Co., Wales Trucking Co., and L. C. Jones Trucking Co.—will haul the pipe freight-free.

Tax Rule Could Help Natural Gasoline

The future of natural gasoline as a petrochemical feedstock may well hinge on a tax ruling from the Internal Revenue Service.

IRS now has before it a request from an independent southwestern natural gasoline producer for clarification of the federal "motor fuels" tax as it applies to natural gasoline.

In Washington this week, one Internal Revenue Service official said offhand that the request may even require congressional action because Congress wrote the definition of natural gasoline into the 1954 tax code.

Also, next week the legal committee of the Natural Gasoline Assn. of America will report to NGAA directors on the importance of the impending tax ruling and possible NGAA action.

Natural gasoline producers and petrochemical processors are hoping to get IRS to exempt natural gasoline from the "motor fuels" tax when it is used as a petrochemical feedstock.

All natural gasoline is currently classified as a "motor fuel" under federal tax law and as such is subject to a 3¢-a-gal. federal excise tax. All companies buying natural gasoline must pay this tax regardless of the way they use the product—unless they can qualify for a federal exemption certificate.

In order to get such certification, a company must be a producer of natural gasoline and post a bond with IRS.

Some integrated oil companies engaged in petrochemical processing—Phillips Petroleum Co. is a good example—qualify for exemption certificates because they are natural gasoline producers.

But petrochemical processors that don't produce natural gasoline cannot now qualify for an exemption from the 3¢-a-gal. tax.

All such processors can get a 1¢-a-gal. "non-highway" use refund, but the additional 2¢-a-gal. for natural gasoline is enough to make it unattractive to non-exempted petrochemical processors.

IRS is now being asked if tax-free sale of natural gasoline to such non-exempted processors would not be in keeping with the intent of Congress in establishing the "motor fuels" tax.

Such wider exemption would make natural gasoline a more attractive supplement—but not a substitute—for LPG as a petrochemical base.

Present and likely future prices preclude the possibility of natural gasoline running LPG out of the market as a petrochemical feed. But under certain localized supply and demand conditions, natural gasoline without a "motor fuels" tax would certainly be an attractive supplementary feed.

If the tax is not dropped for petrochemical processors, natural gasoline producers might be forced into a less happy alternative—separation of the more-commercially attractive butanes from the product for sale as petrochemical feed.

One natural gasoline producer says that butanes comprise about 55% by volume of its natural gasoline stream and could be separated out and sold separately to petrochemical plants without the motor fuels tax applying.

But the company is not anxious to pay for what it calls the "expensive-to-us" separation equipment that would be necessary. It would much rather see IRS drop the motor fuels tax on natural gasoline to be used as a petrochemical feed.

From a technical standpoint alone, petrochemical manufacture with natural gasoline as a feed is already attractive.

The natural gasoline producer asking for the IRS ruling told the government agency that it has had inquiries from several petrochemical plants that have made pilot plant runs on natural gasoline and found "very favorable" results.

Processors in general seem to be looking on natural gasoline as a petrochemical feed with increasing favor.

Both ethylene and acetylene, the base stocks for many petrochemicals, are now being made by high-temperature pyrolisis of natural gasoline with a distillation range of about 100F to 297F.

The latest example of such processing is a $25-million plant being built for Magnolia Petroleum Co. at Beaumont, Tex. by M. W. Kellogg Co. The plant can crack natural gasoline or naphtha to make 380 million lb. of ethylene a year (PW—Mar.6'59,p10).

The plant will also make propylene and butadiene.

The potential petrochemical-processing market is one that natural gasoline can ill afford to lose.

Natural gasoline has been steadily losing its position as a motor fuel component as octane requirements continue up.

As a result, natural gas liquids processors have been looking for new markets for their laggard product. The petrochemical industry has been called the brightest of such potential markets—although it alone would offer a market for the growing volume of natural gasoline.

If the petrochemical market fades out of reach—and retention of the "motor fuels" tax on natural gasoline used in petrochemical making might make it fade away appreciably—natural gas liquids producers will have little choice but to deemphasize the product completely and adjust their processing for still greater yields of LPG and ethane.

Court to Hear Import Appeals

Federal District Judge Joe Ingraham, at Houston, appears set for a major role in tests of individual company allocations under the mandatory import plan.

In two test cases so far, he has granted petitioning companies—Texas American Asphalt Co. and Eastern States Petroleum & Chemical Corp.—temporary restraining orders permitting imports in excess of amounts allocated.

In the Texas American case, the temporary order allowed the company to bring in a cargo of Venezuelan asphaltic crude for its Lacoste (Tex.) plant (PW—May8'59,p13).

The order granted Eastern States last Friday permits it to withdraw crude from bonded storage, pending a hearing.

Next Wednesday, Ingraham will hear the full appeals of two companies challenging the program. One seeks an initial quota, the other an increase in allocation.

Texas American, which placed the first three planned asphalt plants on stream in May, had no allocation for the import period that ends this month, nor was it granted one for the second half of 1959.

The company claims that sufficient asphalt crude is not available in Texas to meet its needs—now 2,000 b/d and later 7,000 b/d.

Eastern States, which has been denied an increase in allocation for the first period by the Oil Import Appeals Board, seeks court relief from import licensing requirements to permit it to import 1.4-million bbl. for the period ending June 30, and 2.3-million bbl. for the period ending Dec. 31. Eastern States charges that the Appeals Board action was invalid.

Four Government Officials Hold the Keys

The men to watch: Mills, of House Ways & Means; Connole, of Federal Power Commission; Saulnier, top economic advisor; and Hoegh, mobilization head

Four Washington officials—some publicized, some not—are emerging as men to watch in governmental action involving oil and gas.

Faces change frequently in Washington, and so do issues. An official whose every move the petroleum industry might be watching one year may later be of little or no interest to oil men.

Take the case of Arthur Flemming, former director of the Office of Defense Mobilization. Three years ago Flemming was busy as the key government man in the initial voluntary program to restrict oil imports. He also made major decisions on amortization for pipeline projects and, generally, was a man watched closely by those interested in petroleum matters.

Now, as a Cabinet member, Flemming heads the Dept. of Health, Education & Welfare—a ranking post, but one with little effect on oil industry operations.

Through time and circumstance, other men in Washington now are on the rise as important figures to the petroleum industry.

REP. WILBUR MILLS (D., Ark.), will weigh the depletion rate when he starts a major tax study in the fall.

When Mills took over the chairmanship of the powerful House Ways & Means Committee last year, he became—at 48—the youngest House member ever to head the tax-writing unit.

But Mills' comparative youthfulness has not kept him from becoming one of the three top men in the House of Representatives, and a close advisor and possible heir to Speaker Sam Rayburn (D., Tex.).

Mills moves in the compromising manner of the Democratic moderates—much like Rayburn and Senate Majority leader Lyndon Johnson (D., Tex.). He approaches any major change with caution and patient study. House members seldom attempt to argue with him when he takes the floor to discuss a fine point of taxation, his specialty.

On the oil and gas depletion provision, Mills is classified as a backer of the present 27½% rate, yet a man who will listen to and weigh carefully arguments that the percentage should be changed.

Mills inherits his interest in depletion in much the same way as Rayburn. Both are from the Southwest, but oil and gas production are not major interests in either of their home districts.

Yet Rayburn has long been a supporter of depletion—seeing the provision as the best incentive to domestic producers to continue the search for petroleum. Even though Rayburn has frequently shown his displeasure with some Texas oil men who have vigorously fought him, his support of depletion has not wavered.

When Chairman Mills gavels the Ways & Means Committee to order next Nov. 2 for tax hearings, his position on depletion is expected to be closely aligned with that of Rayburn.

In fact, the depletion defense in the House rests largely with Mills and Rayburn. There is a general belief that if depletion were ever to come to a vote on the House floor, the percentage might well be cut.

Rayburn has worked to keep the issue in the Ways & Means Committee, and Mills now is the man to whom the Speaker will look for assistance.

Both men are political realists, however. As an aide recently said: "Depletion probably will be cut one of these years—but I don't think Rayburn and Mills are going to let it happen this year or next, or any sooner than necessary."

Mills' committee hearings in November are designed as the first Democratic move toward a broader tax base and a tax revision bill in 1960—election year.

RAYMOND J. SAULNIER, chairman of the Council of Economic Advisers, is the President's personal watchdog on oil prices.

Saulnier recently got into the oil pricing picture by way of a new Administration committee, which has the job of watching government activities bearing on prices.

The Sunday name of Saulnier's group is "The Committee on Government Activities Affecting Prices & Costs"; its everyday name is the "Activities Committee.

Saulnier is one of the chief anti-inflation strategists in the Administration.

He recommended the activities committee last year as part of the Administration's efforts to stabilize the general price level. When President Eisenhower bought the idea, Saulnier became chairman. Members of the committee include high-ranking representatives of big government agencies—such as the Interior and Commerce Depts.—which affect prices.

Saulnier was responsible for tacking the price warning onto Eisenhower's mandatory oil imports proclamation.

Neither the special Cabinet committee's recommendations nor the findings of the Office of Civil & Defense Mobilization contained any reference to prices when they went to Eisenhower.

But when the proclamation was published, the price language had been added.

As Eisenhower's lightning rod on prices, Saulnier was fearful the oil industry might increase prices and use import curbs as an excuse.

One of Saulnier's main functions is to channel price complaints about government programs—such as oil imports regulation—to OCDM.

Already Saulnier has sent to OCDM

to Depletion, Gas Regulation, Oil Prices

complaints about heating oil and asphalt prices.

OCDM has strict responsibility, under Eisenhower's proclamation, to evaluate the complaints. The proclamation reads:

"In the event price increases occur while the program is in effect, the director [of OCDM] is required to determine whether such increases are necessary to accomplish the national security objectives of the proclamation."

Any Presidential action on oil prices will be taken only with Saulnier's advice and approval.

Although Saulnier's job on oil pricing is theoretically limited to passing on complaints to OCDM, Eisenhower would undoubtedly consult Saulnier before acting—or deciding not to act—on any OCDM recommendation.

Saulnier, an expert in finance, was a professor of economics at Barnard College, in New York, before he began his federal duties. He first became a member of the three-man Council of Economic Advisers when Arthur Burns was chairman, then succeeded Burns in 1957.

The council chairman traditionally has been the President's top economic strategist. It took some months for Saulnier to become as accepted by Eisenhower as Burns had been, but Saulnier now is one of the most influential men in the Administration.

WILLIAM R. CONNOLE, vice-chairman of the Federal Power Commission, is becoming increasingly influential in natural gas matters.

While some FPC members have dragged their feet on producer regulation since the U.S. Supreme Court's Phillips gas decision in 1954, Connole since his appointment in 1955 has strived for an early and workable method of determining producer gas prices.

Because he insists that production costs are a vital factor in rate determination, and because he is FPC's strongest adherent of regulation, Connole has become something of an enemy in the view of many gas producers.

But he has the respect of those who disagree with his views. "He is smart, he works hard, and he does his homework," says one Washington gas industry representative. "When he takes a stand on a case, you can argue his theory but seldom his knowledge of the case."

Connole took a middle-of-the-road position on such natural gas bills as the Harris-O'Hara legislation. He did not believe the bills would accomplish their announced goals.

"No system of rate-making which completely eliminates costs and concentrates only on demand will ever succeed," Connole says.

He believes FPC must consider costs in producer regulation, but not follow a course of slavish adherence to the "eminent domain" concept or so-called public utility control.

Looking at FPC's problems, Connole sees initial gas prices in contracts in South Louisiana as the most important short-range difficulty. He wants FPC to start now to investigate producer rates, which rose from an average of 8¢ to 21¢ per Mcf. in four years. Connole says he doesn't know whether the prices are too high—or even too low—but he thinks a strong look is necessary.

FPC's major long-range problem is gas pipeline certification, Connole believes. "There is only so much coke in the bottle," he says. "The problem is—how many straws can fit?"

Connole is pressing for formation of a national energy policy—covering fuels and power.

"It is the responsibility of the government and industry to determine if we are getting the greatest possible use from our natural resources," he says. He feels that the need for a national policy is becoming increasingly evident—a policy which would not be aimed at helping or protecting a particular fuel—such as coal or natural gas—but at the proper role for each.

Connole's present term on FPC expires next June, and he is expected to be reappointed to another five-year term. When he was first named to the commission, in 1955, he was the youngest member of a federal regulatory body.

LEO A. HOEGH, former Governor of Iowa and now director of the office of Civil & Defense Mobilization, would evaluate any oil price increase.

Hoegh (pronounced Hoig) is a Republican who headed the Civil Defense Administration, and who kept the top job when that agency was merged with ODM to form OCDM. He inherited from Arthur Flemming and Gordon Gray a key role in oil imports policy-making.

It was Hoegh who had to issue a quick certification that imports threatened national security before President Eisenhower could initiate the mandatory control program.

But in that instance—as in the present oil pricing function of OCDM—Hoegh has relied heavily on his staff and other government agencies, and so far has not become as personally involved in oil policy decisions as was Flemming.

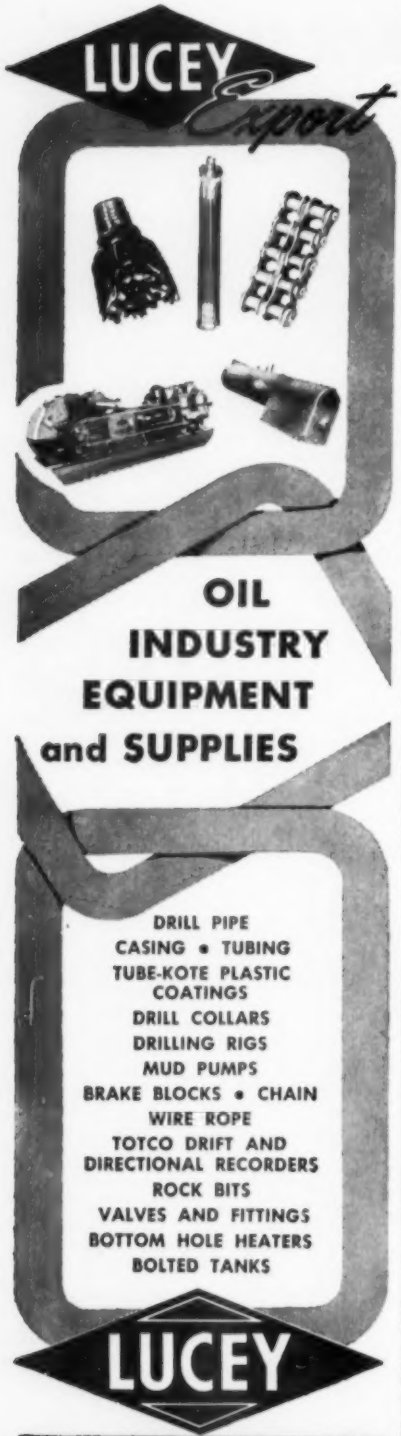
If any general increases in oil and product prices occur, however, Hoegh will assume an eminent position in oil regulation.

Hoegh's present duties—handled by his OCDM staff—are to watch price increases and then evaluate them.

In gathering data on oil price changes, OCDM leans heavily on other government groups—the Interior Dept., the Labor Dept.'s Bureau of Labor Statistics, and Saulnier's White House Committee.

The second portion of Hoegh's duties—evaluation of a price increase—would be the tough part.

One of Hoegh's top aides says: "If price increases occur, we must decide whether they are normal or whether they are an inappropriate byproduct of the imports program. It would be a tough job, because of the industry's constant price fluctuations, demand changes, and seasonal and geographical differences."



What's New / IN THE INDUSTRY

Sinclair Oil and the Oil, Chemical & Atomic Workers International Union have reached a new agreement on fringe benefits, Millard E. Stone, vice-president and director of industrial relations for Sinclair, announced this week. The contract, covering about 8,000 employees in four Sinclair companies, was renewed for two years. Wages, which were increased early in 1959, were not at issue. The agreements on benefits, which will run for five years, include retirement, group life insurance, and medical expense plans.

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Four oil companies are seeking new or increased import allocations for the second half of 1959. Gulf Oil, Southeastern Natural Gas, Hunt Oil, and Patchogue Oil Terminal have petitioned the Oil Import Appeals Board for hearings. Gulf, which received second-half allocations of 2,141 b/d of residual fuel, says it needs "at least 35,000 b/d" because of contractual obligations stemming from its Venezuelan concession agreement.

Gulf's petition closely paralleled a similar appeal the company made to OIAB during the initial allocation period. This appeal was rejected last week, along with appeals by Atlantic, Texaco, California Standard, Sinclair, Rado Refining, Texas City Refining, Mohawk Petroleum, and White Fuel.

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Louisiana's depth bracket oil allowables will be held "as is" in July—for the tenth straight month. Ashton J. Mouton, Jr., state conservation commissioner, said that the allowable will be set at 34% of the March, 1953, level. Continued reduction of the permissible, he explained, would make it uneconomic for anyone to come into Louisiana to drill for petroleum.

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The Bureau of Land Management has accepted over $1.7-million in bids for 23 offshore Florida tracts. Eighty tracts on the Outer Continental Shelf off southwest Florida were offered. Of the 23 tracts bid for, Gulf Oil Corp. and The California Co. bid jointly on 22. The latter company bid independently on one additional tract (PW—May29'59,p10).

•

Great Lakes Pipe Line Co. will launch a $10-million expansion project next month. Included in the expansion are a new terminal at Marshall, Minn., and a 12-in. line that will close the gap in one of the company's Des Moines-Chicago lines. The gap exists between Iowa City, Iowa, and Middlebury Junction, Ill.

•

Oil and gas leasing regulations in the Rocky Mountain states must be made more attractive than other oil areas, according to Paul Faust, of British-American Oil Producing Co. His reasoning: The oil industry is "relatively new to the Rocky Mountain states, which don't have the same attraction for companies as other oil centers, such as Oklahoma and Texas." If states are to encourage development of oil leases they should provide plats of available land, indexed tract books, and complete case files on each tract, said C. E. Brown, of Pan American Petroleum Corp.

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M. W. Hankinson, assistant chief landman of Humble Oil & Refining Co., is the new head of the American Assn. of Petroleum Landmen. New vice-presidents are Ralph L. Cormany, Signal Oil & Gas Co.; Robert M. Garst, Pan American Petroleum Corp.; and John H. Folks, Carter Oil Co.

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AT-A-GLANCE
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PETROLEUM WEEK

The issue of oil imports promises to be a continuing controversy in Congress. Here is the latest example of how imports can be injected into an argument: Sen. George D. Aiken (R., Vt.) hinted that the "oil industry" was working for Senate confirmation of Lewis Strauss as Secretary of Commerce. Aiken also indicated he was fearful that New England oil prices will be driven up as a result of the imports program. Therefore, the Vermont lawmaker said, he was uncertain how he would vote on Strauss's confirmation. Actually, Strauss exercised little influence on the Administration's oil import policy; he assumed his duties from Sinclair Weeks only late last year, after mandatory controls were on their way. And note that two of the Senate's most ardent advocates of import controls—Sens. Mike Monroney (D., Okla.) and Ralph Yarborough (D., Tex.)—voted against Strauss's confirmation in the Senate Interstate & Foreign Commerce Committee.

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Rep. James Roosevelt (D., Calif.) is taking the first step toward new hearings on gasoline marketing. Roosevelt, chairman of a House small business subcommittee on marketing, held extensive hearings two years ago on dealer-supplier problems. He promised, and gave, a year's moratorium to allow the industry to work out solutions to dealer difficulties. Now Roosevelt is laying plans for hearings this year to update his information. As the first step, he is sending a questionnaire to suppliers and another to dealers and jobbers covering the same issues he covered in the 1957 hearings. Roosevelt puts 44 questions to the suppliers and 21 to dealers, to be answered by late July. At that time, he is expected to decide dates and locations for hearings.

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A new joint subcommittee of Congress plans a long-range look at energy sources. The Joint Economic Subcommittee on Automation & Energy Sources will conduct studies on the future adequacy of U.S. resources, including oil, natural gas, coal, water power, and nuclear energy. The subcommittee will investigate techniques for development of shale, hydrogenation of coal, and the outlook for commercial nuclear power.

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The Interior Dept. is expected to approve a plan for leasing in offshore Zone 2 in the Gulf of Mexico, the area in dispute between the states and the federal government. An agreement for leasing the area to prevent undue drainage due to production in the state-owned Zone 1 was proposed by Louisiana officials and is now awaiting Interior Secretary Fred Seaton's final endorsement. It covers the area from the 3-mi. offshore state boundary to a distance 10½ mi. seaward, an area withdrawn from leasing in late 1956. Revenues from Zone 2 leasing would be placed in escrow until ownership is decided by the Supreme Court.

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Watch the Supreme Court for an imminent ruling on "price conditioning" in Federal Power Commission cases. FPC did not attach a price stipulation in approving a certificate for sales of offshore Louisiana gas by the CATC group to Tennessee Gas Transmission Co. But an appeals court overturned FPC, and the issue now is before the Supreme Court, where a decision is expected soon.

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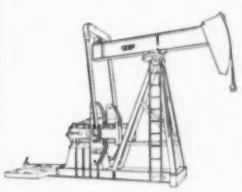

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Oklahoma Waterflood Is Automated

A waterflood program including delayed drilling, fracturing of producing wells, and lease automation is succeeding in tertiary recovery of oil from the Bartlesville sand in Nowata County, northeast Oklahoma.

The waterflood, operated by American Climax Petroleum Corp., involves 408 unitized acres on the east edge of the old Delaware-Childers field. The unit was formed for waterflood purposes in 1956 from 14 leases; operations have been under way since February, 1957.

The leases comprising the project were developed originally in 1906-07, and a peak primary production rate of about 610,000 bbl. was reached in 1907. Vacuum was applied in 1913, then discontinued in 1932 by mutual consent of the operators.

A compressor plant was built in 1934, and air-gas injection successfully applied until 1956, when the plant was dismantled preparatory to waterflooding.

American Climax Petroleum Corp. has followed a careful plan of development in preparing the unitized acreage for waterflooding.

All old producing wells were carefully plugged, and new wells drilled to conform with a five-spot spacing pattern. Pipe 6⅝ in. in diameter was run to the top of the oil sand in the new holes and cemented in place.

Since a method of delayed drilling was practiced, the open-hole section in each well was filled with cement until fillup was accomplished. About 3.4-million bbl. of water were injected before the first producing well was drilled in.

The producers were opened with a small air rotary rig and completed by hydraulic fracturing. Fracture treatment consisted of 3,000-6,000 lb. of sand and 2,000-3,000 gal. of oil.

Input wells were completed by setting 10 ft. to 20 ft. of surface pipe, drilling through the oil sand, and shooting with 3 qt. of nitroglycerin per ft. of pay. A burlap packer on 2-in. cement-lined tubing was set on top of the pay and cemented with 20 sacks.

Individual automatic well controls originally installed have been removed. The oil wells now produce continuously on electric submersible pumps.

Due primarily to fracturing, the removal of larger volumes of fluid than originally anticipated has eliminated the necessity for controls on each well.

METERING TANKS (top) and sump tanks (bottom) of automatic custody transfer system used by American Climax Petroleum Corp. in the old Delaware-Childers field.

If production rates decline, they may be installed again.

The original control system consisted of ⅜-in. plastic tubing hung in each well at the same level as the electric pump. Raising or lowering the fluid level in the well changed the pressure in the tubing and actuated a pressure-sensitive switch at the surface which controlled the electric pump.

A water-supply well completed at 1,769 ft. in the Arbuckle gives the unit a potential capacity of 16,000 bbl. of water daily.

The well is cased with 1,480 ft. of 6⅝-in. pipe cemented to the surface. Salt water is lifted from a depth of 500 ft. by a 75-hp. electric submersible pump suspended on 5½-in. cement-lined tubing.

Water is delivered to a header of plastic pipe and sprayed at 30 psi. into a pond for aeration. This removes hydrogen sulfide and carbon dioxide dissolved in the brine. The pond is divided by a baffle to aid in aerating and settling of solids.

The aerated brine flows by gravity to a 170,000-bbl. treating and settling pond where it is mixed with produced brine and chemically treated.

Produced brine is taken from the oil stream at two knockout points and combined with the Arbuckle water.

Both Arbuckle and produced waters are aerated, chemically treated, and filtered prior to injection into the producing formation.

Two double-acting duplex pumps force the water into the injection system at a pressure of 560 psi. Present rate of injection is 11,000 b/d, but the plant has aerated capacity of nearly 15,000 b/d.

The unit is divided into three separate areas for purposes of water injection and production control.

Meters and control valves for the input wells are located in three different meter houses, each of which control approximately one-third of the meters required for the unit. Water injection is controlled automatically, but the meters are checked every two days or so and regulated if necessary.

Four 210-bbl. test tanks are situated at each of the meter houses to

USE HERCULES

equipment to
produce MORE oil
at LESS cost

HERCULES TYPE SOS

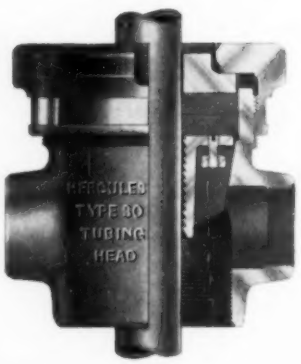
TUBING HEAD

Hercules "Type SOS" is a 4000 pound test stripper tubing head. The lower section contains the neoprene tubing stripper; the upper section or bowl contains the slips and packing arrangement. The SOS is unsurpassed for use in well servicing operations in addition to its use in flowing wells.

HERCULES TYPE SO

TUBING HEAD

Hercules "Type SO" tubing head is actually the lower section of the "Type SOS" tubing head, containing the slips and packing arrangement. It is particularly suitable for pumping due to its compactness, being approximately 12 inches high.



HERCULES TOOL TULSA

HERCULES Products are sold through All Supply Stores

HERCULES TOOL COMPANY

Manufacturers of Oil Field Equipment

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Export Representative Oil Field Equipment Co., Inc. 90 West Street, New York, N. Y.

receive oil. In addition, all producing wells are connected onto a header to permit 24-hour production tests of each well or combination of wells having fluid production rates of less than 210 bbl. daily.

The metering systems operate independently of the 200-bbl. surge tank to provide an automatic custody transfer capacity of about 5,000 b/d of oil.

The custody-transfer cycle of oil to the pipeline begins with the starting of the transfer pump and the opening of the shutoff valve.

A circulating pump activated by the first float switch operates continuously to send oil through a BS&W monitor and back into the tank. If bad oil is detected, a three-way valve diverts it back to receiver tanks, and chemical is automatically injected. Bad oil through the monitor also actuates a siren.

Good oil is pumped from the surge tank into the metering tank. A float switch in the bottom neck of the metering tank is closed by the oil's entry, allowing the metering tank to fill and overflow. An overflow area above the tank provides a time lag for foam and entrapped gases to escape.

When the metering tank has emptied, the valve closes and the transfer pump begins another metering cycle.

The Childers unit has not yet reached its peak in production. A gradual increase is being logged each month.

The unit already has produced more than 323,000 bbl. of oil by waterflooding. During 1958, the rate of production increased from 861 bbl. in January, to nearly 62,000 bbl. in December.

Cumulative ratio to date of water injected to oil produced is 23:1; the ratio of produced water to oil is 2.7:1.

The automatic custody transfer system was built by American Climax, using a modified version of a design developed by Phillips Petroleum Co.

Major alterations of the original design include:

- Use of pipeline sump tanks at the base of metering tanks, into which oil flows from the metering tanks.
- Use of electric rather than pneumatic valves throughout the system.
- Use of strip records, rather than circular charts. The strip charts, which American Climax installed six months ago, offer the advantage of allowing runs to be made for an entire calendar month without a change of paper. Circular charts require daily changing. (Phillips is reported to have made this change also.) (PW—Feb.15 '57,p11).

Wherever air drilling solves the problem ... Gardner-Denver has the answer

- Air drilling
- Aerated mud
- Muddiated air
- Mist drilling
- Gas drilling
- Restoring lost circulation

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A background of experience in developing compressors and devising techniques for every phase of air drilling provides Gardner-Denver specialists with a fund of knowledge that's at your service wherever compressed air may solve a drilling problem for you.

Alaska, Canada, United States, Mexico, Australia . . . Guatemala, Honduras, the Bahamas . . . Turkey, Libya, Algeria, Saudi Arabia. Wherever air drilling has been put to work, Gardner-Denver specialists have worked side by side with drilling crews.

In scorching desert temperatures of 135° . . . at 55° below in the Arctic . . . at sea level . . . or at altitudes of 10,000 feet, Gardner-Denver equipment has passed the toughest test of all—field experience.

Specify Gardner-Denver compressors with confidence for air drilling any size hole to any depth, with seismograph rigs or with the largest of land-based or offshore rigs.

Consult your Gardner-Denver air drilling specialist—or write for further information.

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A look at today . . . and a glimpse

Armour Chemicals for oil production

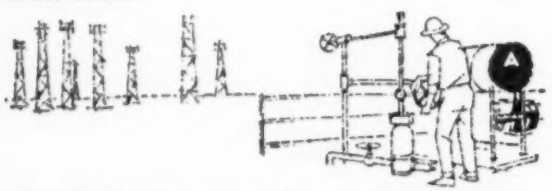
Where they work today

For many years, Armour aliphatic organic chemicals have solved numerous problems in the production of petroleum. That's why you'll find them at work where injection waters are being treated, when HCl is being inhibited, or where water coning problems are being studied.

Treating injection waters

Today there is ever-increasing evidence that shows corrosion inhibitors *alone* are not enough to control corrosion in water flood operations effectively.

A variety of field applications confirm the theory that bactericides are needed, too. In fact, there are many indications of a direct correlation between the presence of sulfate-reducing bacteria and the degree of corrosion.



In brief, here's some new information obtained from a report presented at an A.P.I. committee meeting.

(*a*) By injecting only small quantities of a bactericide into a system known to contain sulfate-reducing bacteria, 80% protection against corrosion was obtained. No other inhibitor was used.

(*b*) Most sulfate-reducing bacteria are known to multiply at an accelerated rate when temperatures increase. Actual tests show bacteria multiply 10 times faster at 95°F than at 77°F. As a result, when temperatures increase, bacteria increase—and so does the rate of corrosion.

In fact, the report shows the rate of corrosion jumps about 100 times with 130°F increase in temperature.

The above information was further substantiated by field tests.

In a cooperative test on an East Texas flood, one of Armour's organic chemicals—a combination inhibitor/bactericide—reduced the corrosion from 68 MPY to 1 MPY.

At the same time, all sulfate-reducing bacteria were brought completely under control.

And this protection was accomplished at a cost of less than 1 mil per barrel of injected water!

Here is what Armour recommended as a treatment procedure for "seasoning" a typical system.

- Slug the system with 40-50 ppm bactericide/inhibitor (basis: fluid injected) for about 3 days.
- Cut back the concentration to 25 ppm for 7 days.
- Further reduce the concentration to about 10 to 15 ppm after a bacterial analysis has verified complete control of bacteria and effective reduction in the rate of corrosion.
- Continue periodic sampling and analysis to assure the treatment continues to be effective.

Armour's Petroleum Section is aware that certain field conditions may interfere with the initial slug treatment with a bactericide/inhibitor. Therefore, we suggest that you talk to your Armour representative regarding your specific treatment problems. He can give you recommendations for your special water flood situation.

Check "A" in the coupon for complete information.

New HCl Inhibitor

Armour's new hydrochloric acid inhibitor—Armohib® 28—is now available to the petroleum industry.

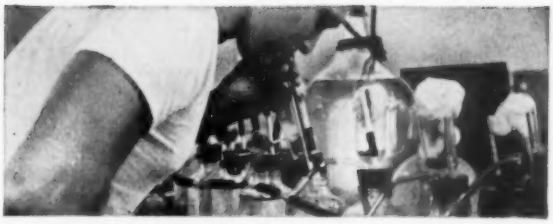
This fatty-nitrogen-derived chemical is of special value when HCl is used to remove harmful deposits or scale during the fracturing or acidizing of oil wells.

As little as 0.25% of Armohib 28 enables you to use a 10-15% HCl solution and get 99.8% protection against pitting and corrosion. The cost? Only $0.0125 per gallon of acid.

In addition, this new inhibitor is completely safe to use. It produces no harmful side effects to reservoirs or fluids.

15% HCl solution on mild steel for 6 hours at 200°F

% Armohib 28	Corrosion Rate lbs/ft²/day	% Protection	Cost per Gallon of Acid	Visual Appearance
(Control)	7.9	—	—	Disappeared in 4 hours
0.10	0.0310	99.6	$0.005	Bright, No Pitting
0.15	0.0260	99.7	0.007	Bright, No Pitting
0.25	0.0190	99.8	0.012	Bright, No Pitting



# of tomorrow

from Armour Chemical

Further testing of Armohib 28 at 265°F has also produced excellent corrosion protection on mild steel.

Here are some additional advantages of Armohib 28:

- It effectively controls corrosion of 316 stainless steel, monel, bronze and mild steel.
- It is effective over a wide temperature range.
- It's non-staining. Will not deposit a waxy surface film on treated metal; leaves the surface clean and bright.
- It will not precipitate in the presence of ferric ions.

For more protection against HCl corrosion at less cost, put Armohib 28 to work in your acid treatments.

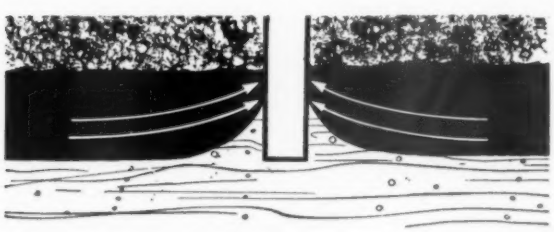
For more data, check "B" in coupon.

Where Armour Chemicals will work tomorrow

Solving the Water Coning problem

Laboratory data and field tests indicate that certain Armour water-soluble cationic chemicals—when introduced into the coned area of a producing well—will considerably reduce the water/oil ratio.

These findings were recently substantiated in a test on one well of a two-well field producing into a common tank battery. During the test, *oil production* was increased from 200 to 390 barrels per month!



The treatment consisted of solubilizing 40 to 50 gallons of the proper Armour surfactant in a 210-barrel tank of produced water. The water was then slowly pumped into the well to be treated, followed by a quantity of untreated water to displace all the treated fluid from the annulus into the cone.

This approach is based on work done by Dr. Alan S. Michaels of M. I. T.

Admittedly, additional research and field tests are needed. Armour Chemical is continuing more test programs in cooperation with several producers.

Check "C" in coupon for more complete information.

If you have problems in oil production, contact Armour. As the leading producer of organic chemical corrosion inhibitors/bactericides, we are qualified to help you determine the right chemical for your special situation. Send the coupon. Or better yet—call us today!

NEWS NOTES

Washington, D. C. Patent #2,733,206 recently issued to Armour and Company covers water flood treatment with dicoco dimethyl ammonium chlorides, or with compounds containing this chemical. Included in the patent claims are inhibition of bacteria, prevention of corrosion, and decreasing of interfacial tension between oil and water phases.

Kansas. Cost figures from a water injection system in this state, just released, show an Armour corrosion inihibitor/bactericide saved the operator almost $66,000.00. Total cost of the chemical was only $2,500!

Illinois Basin. 2½ gallons of an Armour Chemical recently increased the water intake of an injection well here from 19 to 35 barrels of water per day. After 3 weeks, with no further treatment, the well still was able to take 31 BWPD!

Texas. During a recent field test, one of Armour's polar organic compounds proved to be the only product to foam oil effectively. It is believed this chemical will prove to be very valuable in wet-gas wells which have built up a liquid head great enough to kill the well.

Leader in Progressive Fatty Acid Chemistry

ARMOUR CHEMICAL DIVISION

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Armour Chemicals can save you money

Check here for more information on your field of interest.

☐ A ☐ B ☐ C

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PW-6-59

Armour Chemical Division • 3155 W. 31st St. • Chicago 9, Ill.

New Tool Helps Orient Cores

Shell Oil Co. has developed a new and more sensitive magnetometer that helps company geologists orient core samples to their formations. This will help define the shape of sand deposits.

Shell's magnetometer was custom-built by company physicists along principles developed at Carnegie Institution in Washington, D.C.

The theory behind the development of the Shell device is that the alignment of sand grains in a formation will reveal the direction of the currents that deposited them.

Once this direction is determined, it serves as a clue to the shape of the deposit.

Thus, if oil is found in one place in the deposit, the deposit-shape clue can be applied in drilling other wells in the formation, says Shell.

Shell scientists reached the conclusion that sand grain alignment would indicate the direction of the currents that deposited them after a study of Galveston (Tex.) beach about eight years ago.

This conclusion is taken for granted now, but it was new eight years ago. The Shell men are believed to be among the first to use this information as a working hypothesis.

Surface sand or rock samples can be oriented, and the individual sand grains in a core can be studied under a microscope to determine their direction.

But the big problem is how to determine which way these grains pointed in the underground formation.

The key to Shell's device is its extra sensitivity, which enables it to determine the directon of the magnetic pole in the core sample.

As the sand grains settled into formations millions of years ago, they lined up toward the north magnetic pole because of the magnetic material —called magnetite—within them.

As the sand was compacted, the magnetite was locked in place.

But because this magnetic pull is so weak, a hypersensitive instrument is needed to measure it.

Company officials say the new magnetometer is much more sensitive than conventional devices used on trucks or airplanes to record the differences in the magnetism of geological strata on a large-scale basis.

Because the north magnetic pole has not always been in the north as it is known today, the scientist also must know where it was when the sand grains were deposited.

The north magnetic pole now is located in northern Canada. But about 200-million years ago, it was in the neighborhood of Argentina.

Shell scientists have established the positions of the north magnetic pole during the various geological ages by collecting representative rock samples and measuring the direction of their magnetism.

Once the direction of the core's magnetism and the location of the north magnetic pole at the time the core material was laid down is known, the geologist can determine how the core was oriented in the formation.

Then the individual sand grains in the core sample are studied to find the direction in which the majority of them point.

This direction, coupled with the magnetism direction of the sample and the pole's location during this age, helps in determining the shape of the sand deposit.

Results have been good, so far, but there still is room for an even more sensitive instrument, say Shell officials.

Company geologists say a more sensitive magnetometer is needed because in some cases the sedimentary cores are weaker (from a magnetic point of view) than the average rock and cannot be used.

Some cores are of no value because the magnetism within them is not stable and they may be remagnetized during the coring operation.

CORE PLUG is put in magnetometer to determine direction of core's magnetic pole, thus orienting it to the formation.

Sound Waves Clean Fossils

A new method of washing microscopic fossils out of rock samples with sound waves is giving better and faster geologic data to Shell Oil Co.

Paleontologists study fossils (either animal or plant) found in samples from drilling tests or surface outcrops. Many of the fossils are so small they must be magnified 30 to 60 times to be identified.

The fossils give valuable information on the geologic age of a bed, whether it was laid in fresh or salt water, the depth of the water, and other factors that help geologists find areas favorable to oil accumulation.

To find the fossils, a paleontologist first crushes the rock sample until no piece is larger than ¼ in. in diameter. The particles are then soaked in water to soften the material, and are screened over fine mesh to remove the mud from the sand grains and fossils.

The paleontologist then puts the remaining material under a microscope and picks through the sample with a needle to uncover the fossils.

Ultrasonic scrubbing speeds the fossil search by reducing the amount of sample material the paleontologist must pick through, and by cleaning the surface of the fossils for easier identification.

Under the new process, which was developed by E. H. Stinemeyer, division paleontologist in Shell's San Joaquin (Calif.) division, the samples are screened, then put in test tubes with water, detergent, and various chemicals.

The test tubes are placed in a plastic frame that suspends them in a stainless steel box, partially filled with water, where ultrasonic waves transmitted through the water scrub clay and silt from the fossils.

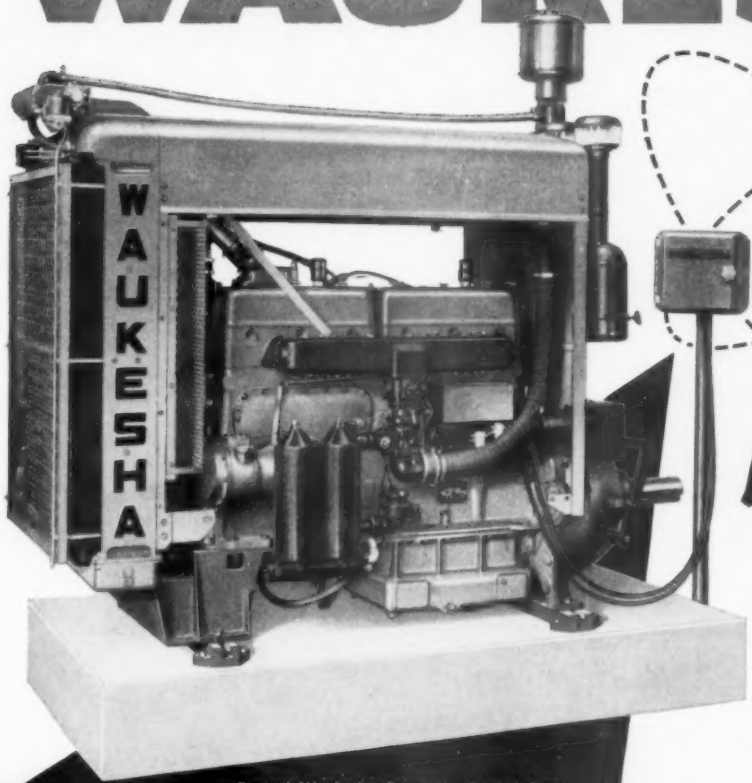
The ultrasonic waves are generated by a small machine, only 1 cu. ft. in size, that transforms electrical energy into sound waves. The only audible sound is a faint hiss.

Stinemeyer says the choice of chemicals added to the samples is the key factor, and the blend varies with different types of samples.

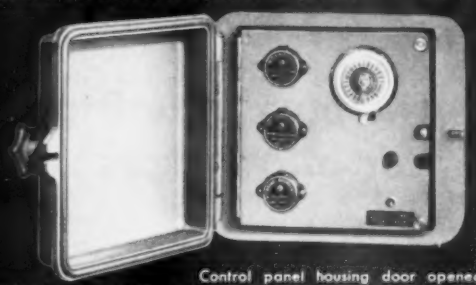
The ultrasonic cleaner also is being used in sandstone studies to remove cementing material holding the grains together, and to clean otherwise inaccessible parts of larger fossils.

Stinemeyer says the new cleaning method will increase the paleontologist's efficiency considerably.

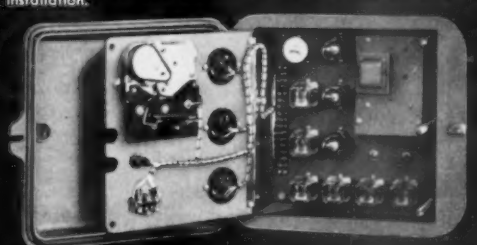
WAUKESHA



Typical Waukesha *Engomatic* Control System installation on a Waukesha Long-Life Oil Field Unit. Note control panel can be mounted in any convenient position.



Control panel housing door opened, showing heavy cast construction, dust and moisture proof seal, starting reset, and time-cycle controls for an *Engomatic* pumping control installation.



Panel open, showing wiring harness, sealed relays and other electrical components, all of highest quality, and designed for long life and easy replacement.

423

Engomatic POWER CONTROL SYSTEM

The Waukesha *Engomatic* Control System meets the demand for internal combustion engine automation. All operation is independent of outside power. It is fully protected with safety shutdown devices and has visual indicators and manual resets, and functions with engines using all standard fuels. Operation can be controlled on a time-cycle basis; by remote control; liquid levels or temperatures; or by any signal peculiar to the equipment involved. Send for Bulletin 1731.

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Automatic Start-Stop by Time-Cycle, or Remote Switch • Fused Control Circuits • Three Position Selector Switch for Automatic or Manual Operation • Intermittent Cranking • Low Oil Pressure and High Temperature Protection • Overcrank Protection • Engine Warm-up Period • Automatic Clutch Engagement—single or repeated for heavy load starting • Automatic Clutch Disengagement when engine stops • Dustproof enclosed plug-in type Relays • Waterproof, Dustproof Control Enclosure.

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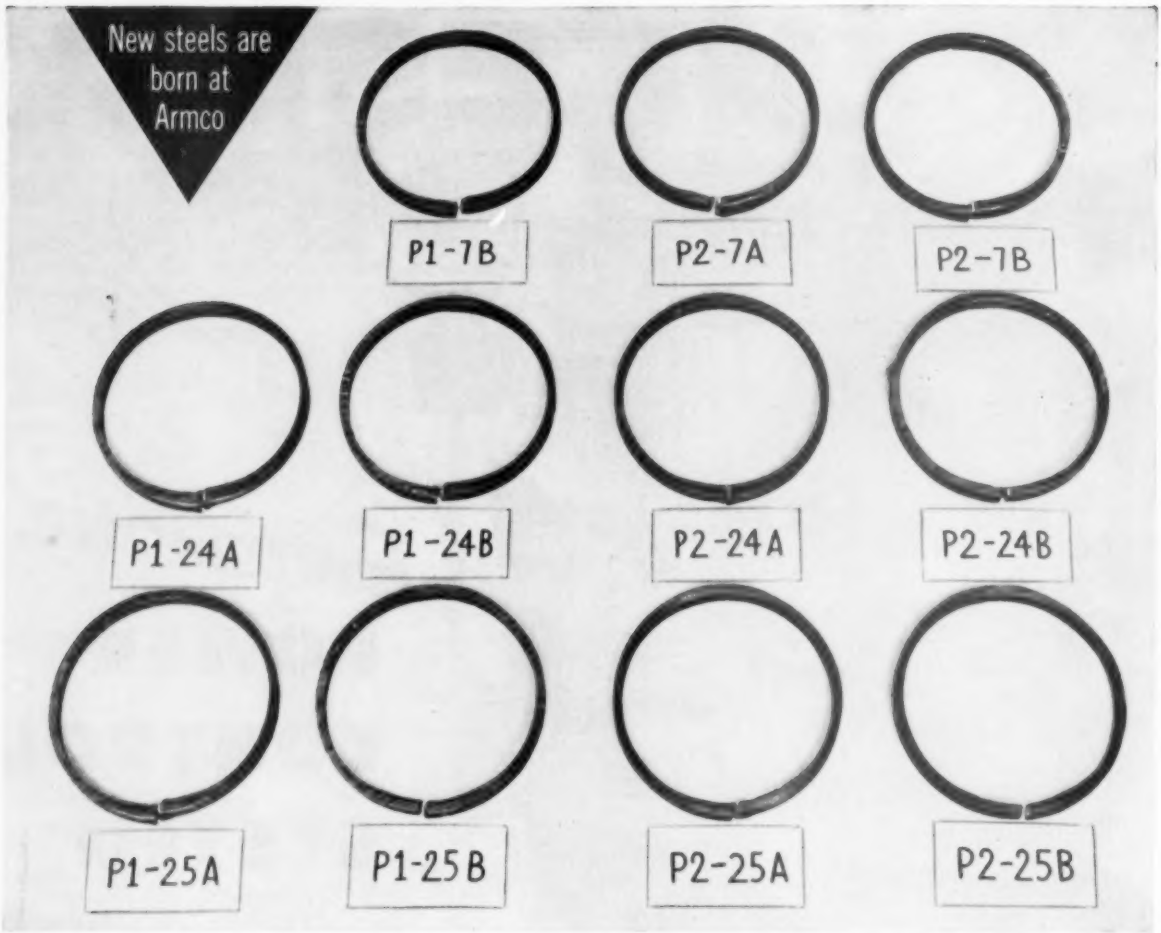

Photo shows a few of the random samples "sliced" from Armco Pipe, numbered, and tested for residual stresses.

How these test "slices" of Armco Line Pipe help insure safer lines for oil and gas

In line pipe, low residual stresses mean more strength in the pipe to meet unforeseen or accidental overloads. To measure these stresses, Armco cut ½-inch long rings from random samples of pipe, then severed them in the circumference. The amount of opening or spring-back of the free edges was used to determine the magnitude of the locked-up stresses, which ranged from 100 to 1000 psi.

The ring test showed that the maximum residual stress in Armco Line Pipe is about 90 PER CENT LESS than similarly measured stresses in many commonly used standard pipes. Get the complete story on the advantages and properties of Armco Line Pipe. Write for the free catalog, "Armco Welded Steel Pipe for the Oil and Gas Industries." Armco Drainage & Metal Products, Inc., 5519 Curtis Street, Middletown, Ohio, or 201 KOME Building, Tulsa, Oklahoma.

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South Dakota Tempo Quickens

Renewed interest has flared up in the Harding County portion of the Williston Basin in South Dakota.

Shell Oil Co. No. 1 Tilus, section 11-20n-4e, a discovery 5 mi. south of principal production in Buffalo field (map), is the latest development in a series that has revived interest and stimulated leasing in this part of the state.

A 2-hour drillstem test at 8,359-80 ft. recovered 570 ft. of slightly mud-cut oil, 90 ft. of oil-cut water (40% oil), and 560 ft. of mud-cut water, with a trace of oil.

One reason for the new enthusiasm: three discoveries since the first of the year.

Earlier in the year, Shell brought in No. 14-16 State, which was completed for 307 b/d on the swab in section 16-21n-4e.

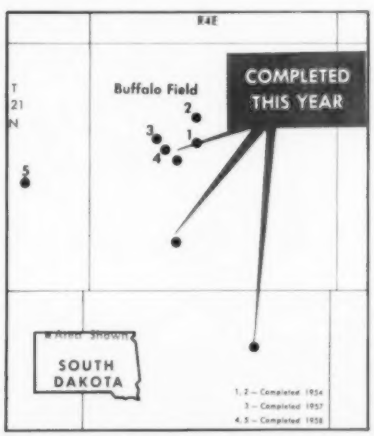
The second success was Shell's No. 14-28 Haivala, section 28-21n-4e, which, although within Buffalo field limits as they were defined earlier this year, is 2 mi. south of the principal producing area in the field. The third discovery was the No. 1 Tilus.

And a drillstem test at a hole drilled by A. L. Schlaijker and H. W. and F. L. Clarkson—offsetting a previous discovery by Schlaijker and Herb Clarkson last year 3½ mi. west of Buffalo field—is reported to have been "excellent." All of the production found in this area so far has been in the Red River (Ordovician) formation.

A significant factor in the development of this area so far is the south-moving trend indicated by the recent discoveries.

No. 14-16 State is at the south edge of principal production in Buffalo field; No. 14-28 Haivala is 2 mi. farther south; and No. 1 Tilus is another 3 mi. southeast.

And no dry holes intervene.



Shell is now drilling No. 32-31 Nieme, 5 mi. south of No. 1 Tilus.

Until recently, production in this area has been painfully slow in developing—only five completions in nearly five years.

Shell's discovery of Buffalo field in 1954, several years after the Williston Basin play proved successful in North Dakota and Montana, introduced production to South Dakota.

The field discovery was followed by another completion the same year. The next production, however, wasn't found until 1957, when Shell completed No. 32-17 Graves.

This led to more activity in the area (PW—Jul.12'57,p22), but nothing more was found until 1958.

That year, Mid-America minerals made a 173 b/d discovery at the south edge of the field, and Schlaijker and Clarkson brought in their 3½-mi. westward outpost.

Buffalo field is southeast of and in line with the Cedar Creek anticline, which traverses southeastern Montana.

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Hydraulic
POWER TUBING TONG

uniform make-up, positive break-out *on every joint*

THE NEW MODEL 3600-H, WITH 9 NEW ADVANCED FEATURES IS FAST, SMOOTH, QUIET, POWERFUL AND ECONOMICAL

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All tests conducted and results
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by America's foremost independent automotive research organization*
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Send inquiry to: P.O. Box 1647 Ford Division, Ford Motor Co. Detroit 31, Michigan

'59 Ford Pickups beat average mileage of other leading makes by 25.2% in Economy Showdown U.S.A.

Here at last is certified proof of the differences in gas mileage between six-cylinder pickups . . . evidence that you can use in your operation.

It was compiled by America's foremost independent automotive research firm after testing 1959 six-cylinder ½-ton pickups of the six leading makes. The trucks were bought from dealers—just as you would. After at least 600 miles break-in, all were brought up to manufacturers' recommended specifications.

The tests paralleled every kind of driving – high speeds and low, open highways and city traffic, even door-to-door delivery. Acceleration rates were carefully timed in each gear to insure accurate results for all makes. And to reduce any human factor, test drivers were continually shifted from truck to truck. In every test, '59 Ford Sixes delivered more miles per gallon than any other make!

Here are the actual percentages:

'59 FORD PICKUP SIXES GAVE
42.6% better mileage than make "D"
31.1% better mileage than make "I"
25.2% better mileage than make "C"
22.0% better mileage than make "S"
9.6% better mileage than make "G"

Taken together, Ford got 25.2% more miles per gallon than the average of all other leading pickups!

What's the secret of Ford's economy? First, of all pickup sixes, only the Ford Six has modern Short Stroke design which reduces engine friction and thus requires less fuel. Second, to this modern engine, Ford has added a new economy carburetor to meter fuel more precisely in both high- and low-speed ranges.

See your Ford Dealer for the complete report of Economy Showdown U.S.A. Visit him today and get the whole story firsthand.

Jack Long
President
Long & Wetzel, Inc.
Mt. Pleasant, Mich.
says:

"We've had less downtime with Ford Trucks than with any other make we've used!"

"We service oil wells all over the state of Michigan, plus the northern parts of Ohio and Indiana and I don't think there's a tougher truck operation. Our Ford Trucks are always on the job and most of the jobs take us a long way off the road—in fact we frequently have to make our own roads.

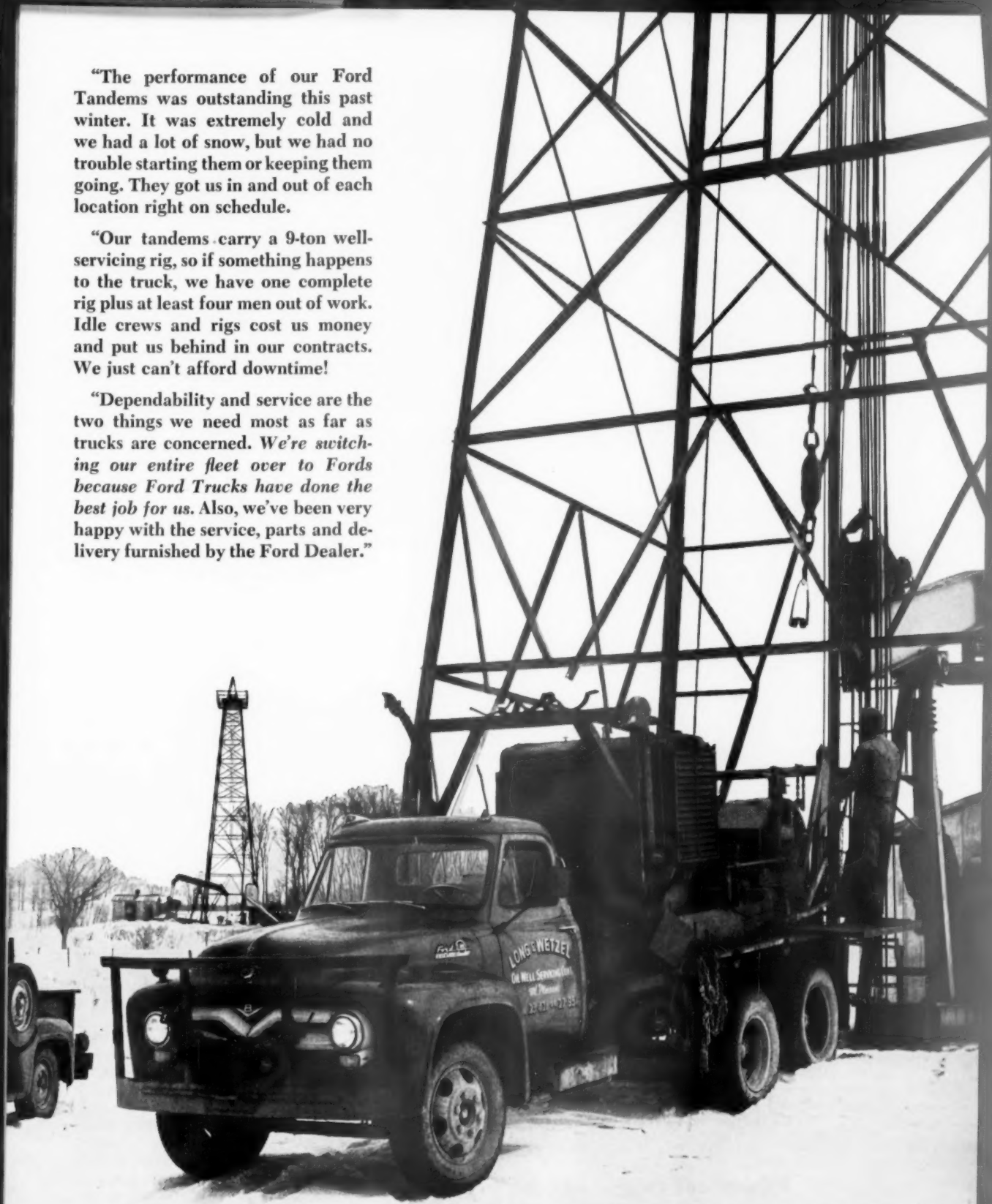
NOW! DURING DIVIDEND DAYS AT YOUR FORD DEALER'S . . .

***GO FORDWARD* for savings**

"The performance of our Ford Tandems was outstanding this past winter. It was extremely cold and we had a lot of snow, but we had no trouble starting them or keeping them going. They got us in and out of each location right on schedule.

"Our tandems carry a 9-ton well-servicing rig, so if something happens to the truck, we have one complete rig plus at least four men out of work. Idle crews and rigs cost us money and put us behind in our contracts. We just can't afford downtime!

"Dependability and service are the two things we need most as far as trucks are concerned. *We're switching our entire fleet over to Fords because Ford Trucks have done the best job for us.* Also, we've been very happy with the service, parts and delivery furnished by the Ford Dealer."



FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . LAST LONGER, TOO!

NEW WELL LOGGING PACKAGE CUTS COSTS... PROVIDES EXTRA INFORMATION

HYCALOG

CONTINUING RESEARCH FOR LOWER COST EXPLORATION

Continuous chromatographic monitoring and analysis of gas shows . . . *along with recording of principal drilling functions* . . . are combined in Hycalog's new GR-FDR package. And automatic operation permits the use of this equipment with *only one* attendant.

The package includes *two complete recording networks* . . . HYCALOG GAS CHRONOFRAC and a hot wire detector. One monitors methane content of mud gas samples and analyzes shows; the other records total combustible gases.

Added to this is the MARTIN-DECKER recording network which automatically measures and records the following drilling functions: weight on bit, pit level, pump pressure, and pump speed. (Recording of other functions such as torque and rotary speed are optional).

A *single* operator compiles and forwards daily all recorded data along with the log of any shows encountered.

With the new GR-FDR package you are sure of getting *round-the-clock* information at a cost far below regular well logging service.

Write for facts on the GR-FDR package. *And, while you're at it, ask about* HYCALOG V-DOOR *diamond drill bits.*

Hycalog, Inc.

505 AERO DRIVE

SHREVEPORT, LOUISIANA

BRANCH OFFICES IN PRINCIPAL OIL PRODUCING AREAS

DIAMOND CORING • DIAMOND BITS • WELL LOGGING • CORE ANALYSIS

Oil's Electric Needs Growing

An electrical power expert says there is an increasing emphasis on service requirements for oil field operations.

F. R. Woerner, of Texas Electric Service Co., told members of the Petroleum Electric Power Assn. last week in Galveston that service demands upon electric utility companies have changed greatly in the past few decades.

He pointed out that current industrial requirements, particularly those in the petroleum industry, are for loads located away from urban areas, usually at least 10 mi. from the nearest utility line.

Woerner said the "capability of our system to measure up to the demands that may be upon us by any combination of users is our constant concern, and yet our customers are charged only for the energy they consume."

High-continuity service now is being supplied for such oil field developments as microwave communication systems, electronic controls, and computers—all without corresponding increases in charges, he added.

"Utilities have in the past stressed continuity of service and stability of voltage and frequency, until not only our customers but their equipment suppliers as well have come to take this type of service for granted," said Woerner.

He added that labor costs have climbed 134% in the past 16 years while electric service charges to industrial customers have not increased over the amount charged in 1937.

Utah's Aneth field is an example of the problems electric power suppliers face when electrifying a field.

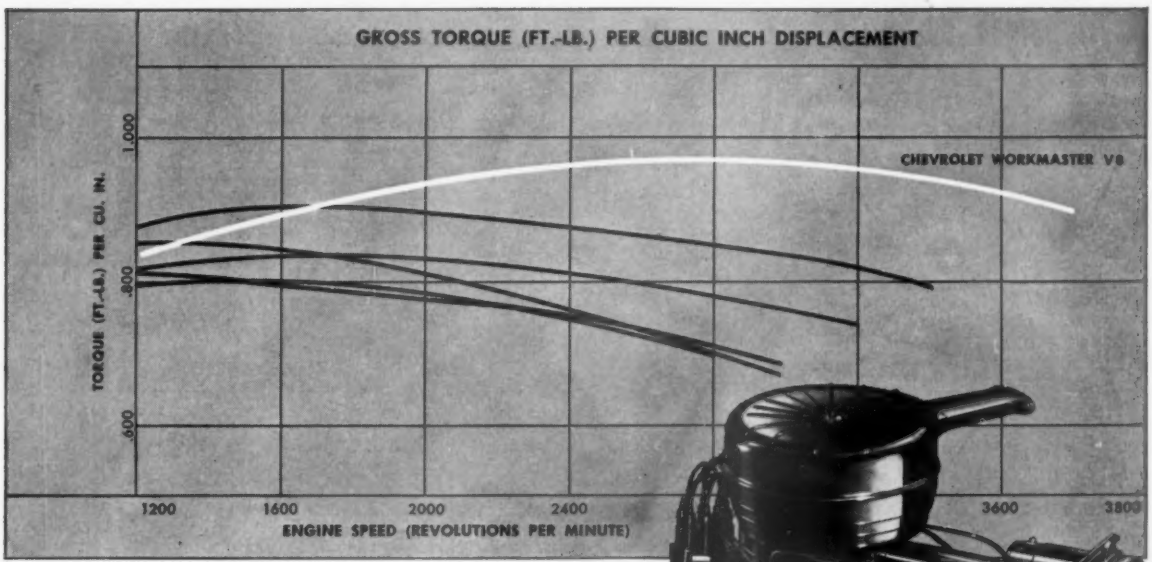
Wayne F. Mulcock, Utah Power & Light, said that as discoveries piled up in the Aneth area and pipeline plans were announced, "it became evident that the area had the possibility of developing into one of the largest oil zones in the country."

"Although most of the wells were flowing," he said, "it would only be a matter of time until pumping would be required."

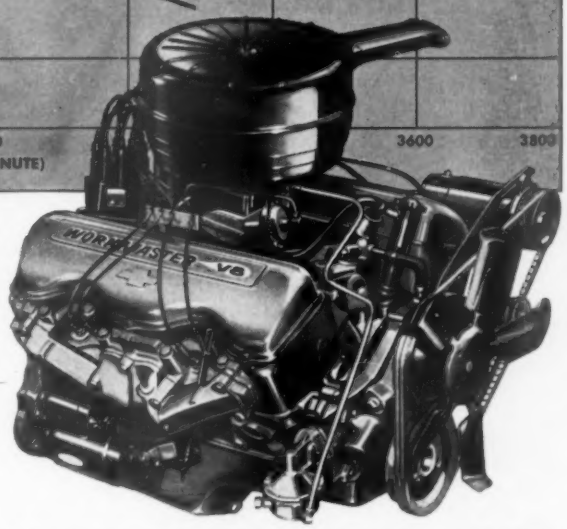
With this in mind, Utah Power started trying to determine the electric load that might eventually develop and also to estimate what it would cost to provide the electric facilities to provide this load.

At the time, the company did not know who all of the prospective customers were "nor did most of those

It's torque that beats tough jobs, and this engine has it to spare!



Proof that the Workmaster V8 puts out plenty of torque. The white curve above shows that the Workmaster provides high torque throughout the *entire range* of operating speeds. The black curves accurately represent the torque output of typical heavy-duty 6-cylinder engines of between 330 and 390 cubic inches of displacement. Curves demonstrate actual torque efficiency, based on gross ft.-lbs. of torque per cubic inch of displacement.



CHEVROLET'S 348-CUBIC-INCH WORKMASTER V8

It's torque that gives a truck plow-horse pulling ability at low speeds and assures the power to keep big loads moving briskly over the highway, right on schedule. And Chevrolet's 230-h.p. Workmaster V8 puts out a brand of torque that's made to order for your toughest big-tonnage hauls.

High torque output is the natural result of the Workmaster V8's unique design characteristics. Short piston stroke and large piston area, for example, comprise a torque-producing advantage, and *this engine provides the shortest stroke in its class.*

Advanced Wedge-Head design, with its fully machined combustion chambers, means high torque, too. It assures high turbulence of the fuel-air mixture and balanced power output from each cylinder. The Workmaster V8 has high volumetric efficiency . . . takes in the fuel-air mixture *efficiently* at all speeds. This, combined with a camshaft design that gives just the right valve lift and timing, assures high torque—extra pulling power to get you through the tough spots!

For the kind of torque and toughness you need to do big jobs better, see your Chevrolet dealer about a Workmaster V8, now standard in Series 90 and 100 trucks. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

No job's too tough for a Chevrolet Truck!

CHEVROLET

NEW!

Humble THREDLOK

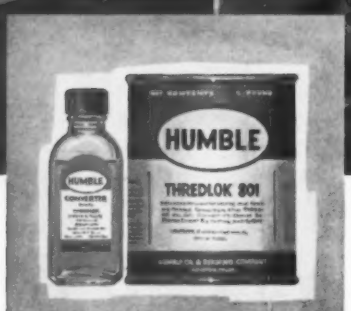
Stronger, Cheaper than tack-welding

THREDLOK 801 is a new compound that seals and locks casing joints tightly and permanently. It offers an easy, economical alternative to welding for bonding the bottom two or three joints in a casing string to prevent casing breakout during rotary drilling.

Extensive use in the field has proved that THREDLOK provides stronger joints than tack-welding. It eliminates the possibility of damage to high-strength casing that may result from welding alloy pipe. And where welding the first two or three joints in a casing string costs approximately $50 to $75, THREDLOK gets the job done for about $6.00.

THREDLOK 801 is available in pound cans, @ $3.00 per lb., at Humble wholesale plants throughout Texas and New Mexico. THREDLOK is also available through many oil field supply stores. Call the one nearest you, or phone or write:

Humble Oil & Refining Company
Consumer Sales, P. O. Box 2180
Houston 1, Texas



How to use

- Remove couplings, carefully clean and dry both male and female threads.
- Mix contents of THREDLOK can, pour converter into can and stir thoroughly.
- Apply THREDLOK to male and female threads with paddle or putty knife, making sure the threads are completely covered.
- Make the joint up immediately. It can then be run into the hole without delay.

HUMBLE

who were active know the exact amount of power they would require or at what location they would want it delivered," he said.

After several months of study, Utah Power & Light decided there was a potential need for between 18,000 and 20,000 kw. of capacity in the area.

"This load estimate was important," Mulcock added, "because once we had committed ourselves to serve even a small part of the load, we would have to be prepared to supply the necessary back-up transmission facilities to handle the ultimate load, and this was a long way from the heart of our system."

Then an estimate was made as to what transmission and distribution facilities would be needed to serve the 18,000 to 20,000 kw, which is expected some time in 1961.

"Having estimated our line requirements as best we could," Mulcock said, "we then had to assure ourselves that—if we spend the money and committed ourselves to serve the area—the oil companies would buy our service."

Nearly all of the wells in the Aneth area are now electrified.

The only exceptions, according to Mulcock, are a few leases believed to be on the periphery of the pool and whose life is very doubtful, and a few one- and two-well pools that are some distance from power lines.

The total number of producing wells in the area so far is 461. This compares with more than 1,200 wells that have been drilled to date.

"In our early estimate," said Mulcock, "we concluded that there was a potential of approximately 2,000 producing wells in the area. We had expected to be able to electrify at least 1,000 of these.

"This estimate was based on 40-acre spacing, which is the state minimum."

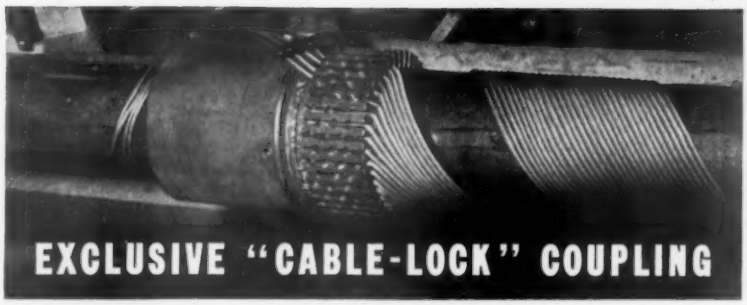
Since then, he continued, the state oil and gas commission has temporarily set 80-acre spacing in most areas.

"But then we are electrifying much more than half of the wells, so we should realize our goal of 1,000."

Secondary recovery projects also are adding to the power loads needed for fields.

Robert H. Angevine, vice-president of Texfel Petroleum Corp. used Oklahoma's Fitts field in Pontotoc County as an example.

He said it is not out of reason to expect the power requirements to jump from the present 4.5-million kwh. per month to around 10-million kwh. per month within four years as a result of a growth in waterflood operations.



EXCLUSIVE "CABLE-LOCK" COUPLING

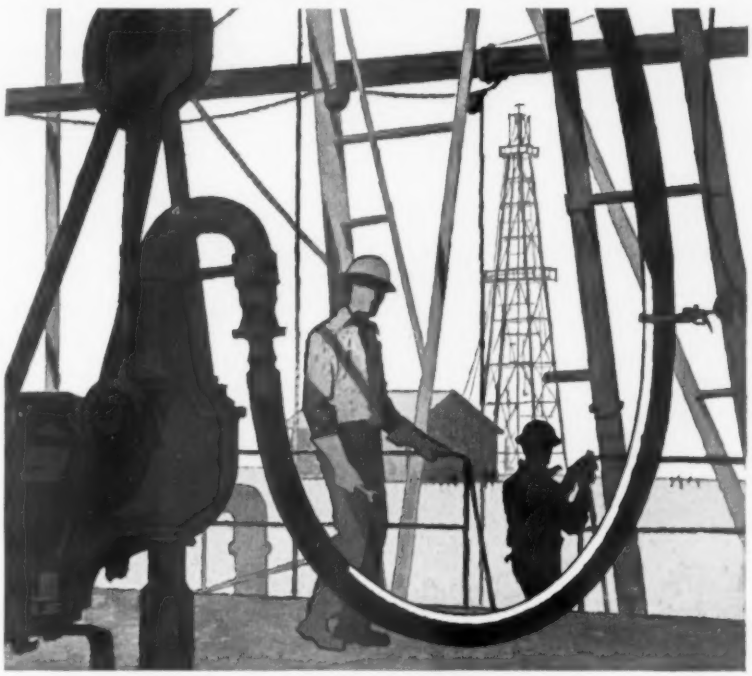
makes Thermoid Powerflex the strongest, safest rotary hose in the industry

Why does Thermoid Powerflex have 40% more bursting strength than the second-best rotary hose?

It's because of the exclusive "cable-lock" coupling shown above, which is integral with every hose length. Note how each of the steel reinforcing cables is accurately positioned to insure equal cable stress. This exclusive construction feature gives up to thousands of extra pounds of evenly balanced holding power from coupling to coupling.

Thermoid Powerflex Hose not only can operate safely at any pump pressure now available, but has a reserve strength that insures against blow-outs, thus guaranteeing uninterrupted service during its long life.

Every length in every size (up to 4" inside diameter) certified API Class C. Ask the Thermoid distributor for full information, or write *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*



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Dupont Incorporated of Patterson, Louisiana, is the first major manufacturer of commercial and industrial marine equipment to offer a fast, economical plan for acquiring costly equipment without a major capital outlay. Equipment is available under this plan to any company of good credit standing *NOW!*

The Dupont Leasing Plan is simple and free of red tape. You fill out one brief application form. When this is approved, the lease is signed and the equipment is built and delivered. Upon delivery of the equipment, you make the first payment. Thereafter, leasing charges may be paid monthly, quarterly, semi-annually or annually.

That's all there is to it!

Advantages of the Dupont Leasing Plan:

- No money down; working capital is not tied up
- Leasing charges may be written off as current business expense
- Leasing payments can be made to coincide with depreciation schedules
- Leased equipment may be moved and used anywhere in the world
- Lessee may specify all machinery and equipment desired
- Equipment acquired under Dupont's Leasing Plan is not carried as a fixed asset or the payments as liabilities on the balance sheet
- Regular lines of credit are left open for other purposes
- Flexibility allows period of lease to be made to company's advantage

Dupont's Leasing Plan covers tugboats, towboats, barges and the full range of special-purpose marine equipment built by the company.

For complete information about this revolutionary plan, write or call	**DUPONT INCORPORATED** PATTERSON, LOUISIANA.	Telephone 3504

What's New / IN EXPLORATION, DRILLING, PRODUCTION

A new shutdown threat hangs over California's Wilmington oil field.

U.S. Judge Harry C. Westover last week told all producers in the field to file answers by Aug. 3 to the government's suit aimed at stopping subsidence.

U.S. Attorney Laughlin E. Waters said that current injection of about 210,000 b/d of water into the field is "markedly less than anticipated."

He said voluntary cooperation of 121 active and 274 inactive producers has not lived up to expectations.

At the same time, however, a progress report to Congress from the City of Long Beach said subsidence "will be totally arrested . . . by spring of 1961, and effectively slowed down sooner."

The Justice Dept. last August filed a suit threatening shutdown of the field because of subsidence at the Long Beach Naval Shipyard but took it off the court calendar in March (PW—Mar.20'59,p42) because it appeared at the time that the injection program was halting subsidence.

•

A test nuclear explosion in the Canadian tar sands will probably take place in February, 1960, if an expected favorable decision is received by Aug. 1 from U.S. officials.

Gerald Johnson, of the University of California Radiation Laboratory, told the Washington chapter of American Nuclear Society last week, that Richfield, Imperial, and Cities Service are willing to pay for a test involving three 10-kiloton devices at depth of 1,200 ft. (see page 58).

•

A Japanese oil company that has been conducting exploration in Alaska with an American firm is now studying ways to get Japanese drilling crews into the state.

Kantaro Kishimoto, president of Teikoku Oil Co., which conducted joint geological surveys with Polaris Exploration Co. in the Palmer area, northeast of Anchorage (PW—May1 '59,p34), says a study of U.S. immigration laws are under way.

Kishimoto says Polaris expects shortly to obtain rights to an 86,000-acre lease of state-owned land at Knik.

The Japanese oil man adds that his company is seeking a stable source of crude for Japan's increasing domestic market. He says his company is negotiating with Polaris for joint exploratory activity on the Knik acreage.

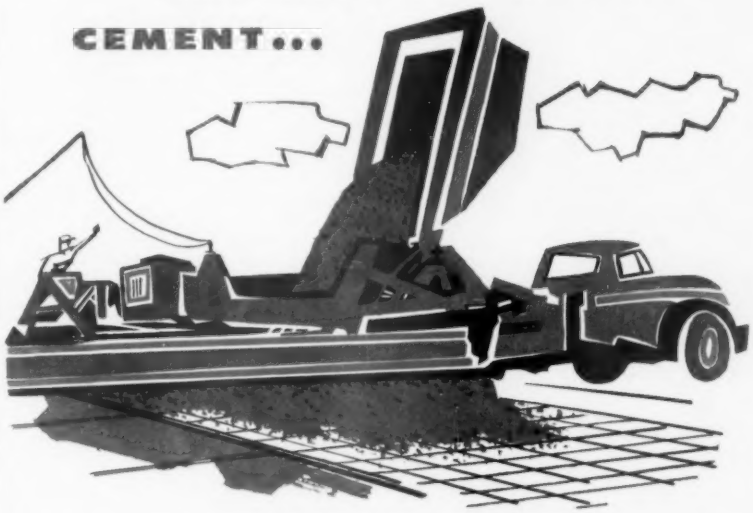
In another development affecting Alaska, the state's Department of Natural Resources will conduct a hearing July 9 on adoption of proposed rules for oil and gas leasing in the state. The rules will become effective 30 days after action on any changes.

•

A bill introduced in the U.S. Senate aims to resolve the controversy

THERE ARE ALL KINDS OF

CEMENT...



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CEMENT ADDITIVE

FOR OIL WELLS!

ONLY Strata-Crete 6

GIVES YOU ALL 6

This improved perlite cement additive generally ***lowers fill-up cost,*** and is ***easier to place*** (requires only normal pump pressures). ***Superior bridging qualities*** and light weight assure complete fill-ups, and the greater resiliency ***reduces fracturing and shattering.*** Strata-Crete 6 can be used with ***any type or brand of cement*** and in itself is ***not affected by high well temperatures.***

Strata-Crete 6 can be obtained from your oil well cementing service company.

GLC

GREAT LAKES CARBON CORPORATION

MINING & MINERAL PRODUCTS DIVISION — STRATA PRODUCTS DEPARTMENT

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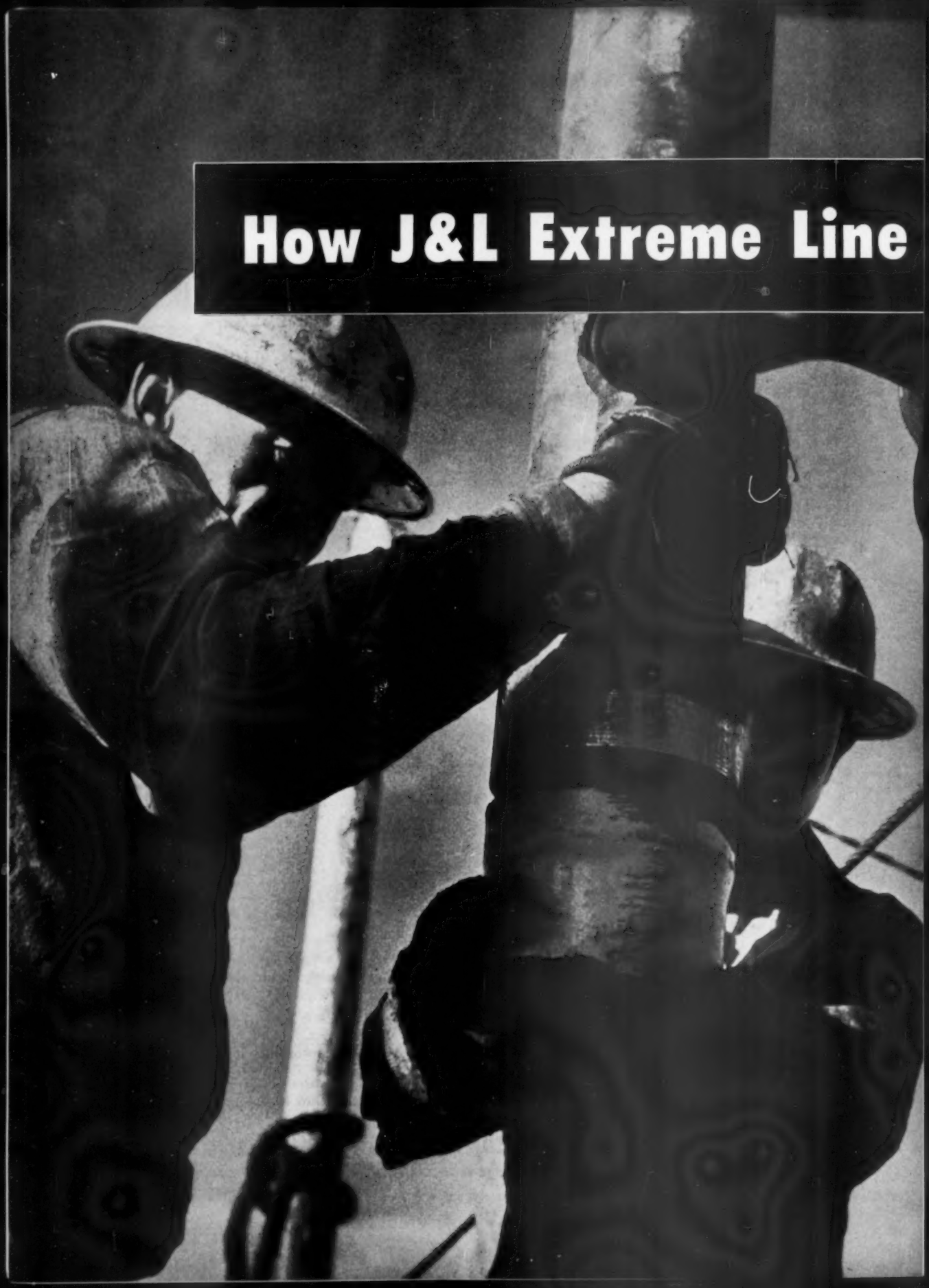
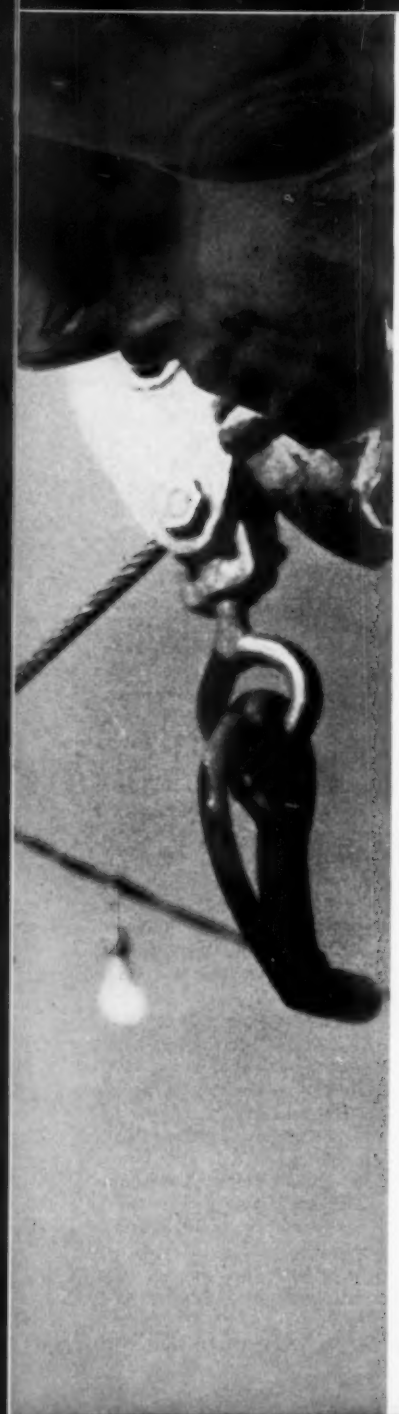

How J&L Extreme Line

Gives You Absolute Sealing



J&L Extreme Line Casing joints have radial and conical sections, completely independent of the threads, which provide a positive seal unaffected by the most extreme internal or external pressures.

Upset box and pin ends, plus modified Acme-type threads with a steep flank angle, also provide high joint strength for long strings in deep holes.

J&L Extreme Line integral joints are streamlined inside and out. The relatively light external upset decreases the possibility of hanging up—you can safely run this casing through packers under pressure.

You get fast, trouble-free running-in speeds. You stab easily, and you cannot cross-thread. You make up with five to seven turns with the spinning line and less than one turn with the tongs.

You get *everything* in *J&L Extreme Line* made under license from The National Supply Company—high strength in tension, burst and collapse—*and* leak resistance! *This is casing that can be salvaged and rerun repeatedly.*

Call one of our specialists now, or write us at Tulsa.

Jones & Laughlin

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If it's sold by J&L....
It's the best available

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DRILLING EQUIPMENT: JONES & LAUGHLIN DRILL PIPE, CASING AND WIRE ROPE, GARDNER-DENVER MUD PUMPS, IDECO DRILLING RIGS, REPUBLIC ROTARY HOSE. **PRODUCTION EQUIPMENT:** JONES & LAUGHLIN CASING, TUBING, LINE PIPE AND WIRE ROPE, AXELSON PUMPS AND SUCKER RODS, CABOT PUMPING UNITS, CENTURY MOTORS, FAIRBANKS-MORSE ENGINES, CONTINENTAL TANKS.

Congrats and $25 for this quip to FABIO SORIA GALVARRO, Compañia de Perforaciones, S. A., Casilla 1215 — La Paz, Bolivia.

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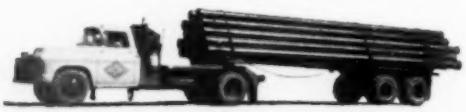
Tough as a wildcat . . . Lone Star pipe meets the exacting quality and stamina standards of API specifications . . . which means Joe Roughneck's specifications.
Lone Star . . . the oil man's steel mill . . . is one of the world's most modern. Every length of pipe . . . API casing, tubing and line pipe . . . reflects quality control from ore to finished product. Made *right* here in the oil and gas country for fast delivery to oil and gas men. You can depend upon Lone Star.

Neighbor, wherever you are, specify Lone Star and we both get a good deal.



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between Interior dept, and persons claiming oil and gas leases in Utah lands recently conveyed to the Navajo Indians.

The dispute arose because of land exchanges made for the site of the Glen Canyon dam. In exchange for land needed for the project, other federal lands were made part of the Navajo reservation, subject to "valid existing rights."

Sen. Frank E. Moss, who introduced the bill, says it would amend the law to read after "valid existing rights, including but not limited to the rights of applicants for mineral leases."

He says this would reverse the position of Interior, which has refused to recognize that such rights have been in effect since before establishment of the Navajo reservation.

•

Lamret Oil & Gas Corp. has started the third thermal recovery project in Texas.

The company fired the first of four injection wells last week on two leases in a Brown County regular field area. Aim of the project is to boost recovery from six output wells now producing about ¼ b/d per well.

The project, second such in West Central Texas, is 3 mi. southeast of a pilot in-situ combustion program which was initiated last February by John DeFord, Trustee, on a lease straddling the Coleman-Brown County line (see page 55).

•

Otis Engineering Corp. shareholders will vote next week on a proposal to transfer substantially all Otis assets to Halliburton Oil Well Cementing Co.

Directors of both companies have approved the agreement and a reorganization plan to remold Otis into a Halliburton subsidiary.

Under the agreement, Otis share holders would receive 212,343 Halliburton shares at the rate of 85/100ths of a Halliburton share for one Otis share.

•

Ambassador Oil Corp. has added 51 producing oil wells to its properties in New Mexico.

The wells, located in Caprock, Loco Hills, Square Lake, Fren, and Grayburg-Jackson fields of Eddy and Chaves Counties, were purchased from R. R. Woolley and asssociated companies, Beverly Hills, Calif. Price was not disclosed.

Ambassador says it obtained all

rights on 2,280 acres of the 3,400 involved, and rights above 4,000 ft. on the remaining 1,200 acres.

•

Christiana Oil Corp. has sold a 40% interest in a ranch and producing properties in California for $4,853,000 to Capital Co., owner of the remaining 60% interest.

The properties involved are the 7,800-acre Diamond Bar ranch in Los Angeles County, and producing properties in East Coyote and Long Beach oil fields.

•

Lone Star Gas Co., Dallas, has acquired a 40% interest in the gas reserves of the Paluxy sand reservoir, Chapel Hill field, Smith County, East Texas; negotiations are under way to buy the remaining 60%.

The 40% interest was purchased from Shell Oil Co., Sun Oil Co., and Magnolia Petroleum Co. for a total price of $2.8-million. Gas reserves are estimated at 80-billion cu. ft.

The remaining 60% is held by Texaco Inc., Sinclair Oil & Gas Co., and others.

•

Mobil Producing Co. paid top bonus of $42.63 per acre in last week's lease sale of Fort Peck Indian lands in Montana.

Mobil paid the top price for a 160-acre tract in section 29-32n-59e, Sheridan County.

A total of 50 tracts, covering 9,383 acres, were leased at a total bonus of $85,357 in the sale.

•

Oil and gas lease brokers operating in Utah may have to qualify as both real estate brokers and securities dealers.

At issue is a Utah Supreme Court decision which held that a broker suing for performance of a contract had no standing because he had failed to obtain a license permitting him to deal in leases and leaseholds.

Since 1934, the Utah Securities Commission has been requiring that such brokers qualify as securities salesmen.

•

Drilling Highlights

North Texas—McCommons Oil Co. No. 1 Elmer B. Brown Estate, section 14, Titus County school land survey, Montague County, was completed as a Caddo conglomerate discovery flowing 322 b/d of 42-gravity oil through

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OF THE
OIL AND GAS
INDUSTRY

Ever look over a watchmaker's shoulder . . . notice the meticulous care and skill with which he does his work?

Watchmakers and Lone Star Steel craftsmen have a great deal in common . . . skill, pride in doing a precise job and an uncompromising standard of quality. Lone Star is *fine* pipe . . . made as carefully as skilled hands and ultra modern equipment can make it.

Always order Lone Star API casing, tubing and line pipe . . . overnight delivery!

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a suit
to see
if it fits...

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Test it . . . try it . . . see how it works. That's the American and Canadian way of coming to a decision.

And that's why we are anxious to have you *try* our special banking services for oil and gas men before you decide on establishing a Canadian banking connection. Our experienced Oil and Gas Department in Calgary is close to all phases of this growing industry, knows trends and credit standings and qualified distributors of equipment. We can give you up-to-date facts and figures about Canada's great natural gas industry.

Whatever your banking problem or need involving Canadian oil and gas, we'd like the opportunity to help you solve it. Instead of just talking about our facilities and service, we're saying "see for yourself."

With more than 500 branches coast to coast, including all the major oil fields, "The Bank" is in a unique position to give you on-the-spot banking help and information on the oil and gas industry.

Take advantage of this demonstration offer. Get in touch with us today. Send for your copy of our map showing Western Canada's oil and gas fields and pipelines—plus Toronto-Dominion branches in the area.

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Head Office: Toronto, Ontario
New York Agency:
28 Broadway, New York 4, N. Y.

20/64-in. choke and perforations at 6,262-81 ft. The discovery is 5 mi. north of Aries Caddo pool.

In Archer County, Gulf Oil Corp. No. 1A J. R. Parkey, Jr., Dallas County school land survey, was completed for 420 b/d of 37.9-gravity oil through 11/64-in. choke and perforations at 5,181-217 ft. in the Mississippian. The discovery is 2 mi. north of County Regular production.

New Mexico—McAlester Fuel Co. and Texas Crude Oil Co. No. 1-HN State, section 16-11s-33e, Lea County, flowed 304 b/d of oil through 30/64-in. choke and perforations at 10,744-70 ft. The wildcat is 2 mi. southwest of North Bagley field.

Nebraska—Skelly Oil Co. No. 1 Reiher, section 28-1n-32w, Hitchcock County, was completed for 348 b/d on the pump through perforations in three zones of the Lansing-Kansas City at 3,816-44 ft., 3,862-70 ft., and 3,910-20 ft. The discovery, said to be the largest producer in western Nebraska east of Denver-Julesburg Basin production, is 2 mi. northwest of Burr Oak field.

West Texas—Magnolia Petroleum Co. No. 1 Kathleen J. Moore, section 19, block 48, T-8, T&P survey, Pecos County, flowed 86 bbl. of 38-gravity oil through perforations at 10,890-95 ft. in the Wolfcamp on 6-hour test on gas lift. The prospect is 7¾-mi. southeast of a lone producer in Cable Wolfcamp pool, Reeves County.

Louisiana Offshore—Midwest Oil Co. and Ocean Drilling & Exploration Co. have dually completed an oil discovery in Block 90, Eugene Island area, flowing 399 b/d of 40.5-gravity oil through 10/64-in. choke and perforations at 10,178-92 ft., and 408 b/d of 39.9-gravity oil through 10/64-in. choke and perforations at 10,323-34 ft. Nearest production on the dome is 1 mi. south in Block 93.

Southwest Texas—Gulf Oil Corp. No. 1 Ruth McLean Bowman, 10 mi. east of Carrizo Springs, Dimmit County, was completed for 140 b/d of 34.4-gravity oil through 14/64-in. choke and perforations at 5,804-22 ft. in the Austin Chalk. The discovery is 10 mi. east of shallow production.

Kansas—Skelly Oil Co. No. 1 Cahoj, section 17-1s-34w, Rawlins County, logged 271 bbl. of 32.7-gravity oil on 15-hour pump tests through perforations at 4,065-72 ft. in the Upper Lansing. The discovery is 10 mi. northwest of Pallnow field, Decatur County.

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20/64-in. choke and perforations at 6,262-81 ft. The discovery is 5 mi. north of Aries Caddo pool.

In Archer County, Gulf Oil Corp. No. 1A J. R. Parkey, Jr., Dallas County school land survey, was completed for 420 b/d of 37.9-gravity oil through 11/64-in. choke and perforations at 5,181-217 ft. in the Mississippian. The discovery is 2 mi. north of County Regular production.

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Steel mill finishing operations, like threading this length of casing, show how steelmakers are part of the driller's team because . . .

Texas Wells Begin in Pittsburgh Steel's Mills

Skilled tube makers with half century's experience and distributors whose first loyalty is to you, join your team when you use Pittsburgh Steel Co.'s API Oil Country Goods.

We never saw an oil rig set up in a steel mill but we maintain that's where every well begins. Just as you start digging a ditch by getting a shovel, so the first step in drilling an oil well is getting rugged, dependable materials like drill pipe, casing and tubing.

That's where Pittsburgh Steel Co. starts its partnership with the oil man. If the steelmaker has been producing good materials for nearly 50 years—and Pittsburgh Steel has—he's a good bet to team up with.

You have an added advantage in that Pittsburgh Steel Co. is linked to you by independent distributors whose first loyalty is to you, the customer.

Independent distributors handling Pittsburgh Steel's oil country goods are a good bet for another reason. They move fast to keep up with all technological advances in oil well drilling. They must because they stay in business only because they give you what you want, when you want it.

Let a typical Mr. Independent Distributor tell what's been going on in the oil business recently:

• **Drilling Comes of Age**—"Oil well drilling has come of age since World War II," said this Texas distributor. "There was a day when setting up a rig in a new location meant moving half a distributor's store out there. A telephone call to

The independent distributor's store is a big-time operation with better stocks than ever.

the store was likely to end with a reminder to 'Bring a 4x1 swedge.' The distributor's man knew what that meant. It took as long then to set up a rig as it does now to bring in the well.

"Today it's a business for trained, industrious and intelligent men. Portability of rigs, dual completions, mud engineering—all the technological advances have speeded up drilling and made it a precise, scientific operation. Oil men plan better now; they look further ahead."

As a producer of API oil country goods, Pittsburgh Steel also has stepped up quality to meet drillers' demands. Torsional strength, surface quality and resistance to fatigue stresses and collapse all have steadily improved as drillers probed deeper in the earth and encountered greater pressures.

Pittsburgh Steel provides the driller with tubes that have defect-free surfaces and dense, sound grain structure which can take the strains of double piercing. Finishing operations, such as threading and testing, have kept pace.

That's why, with Pittsburgh Steel oil country goods on your rack, you can pick up any joint to start or end your string without worrying whether it will stand up.

Nothing less will do when you have a three-mile string rotating at 300 or 400 rpm with a total weight of perhaps 400,000 pounds hanging from the last joint! That's steel at it's best . . . the kind of steel you get from Pittsburgh Steel and Mr. Independent Distributor.

Put this combination on your team today. Pick up your telephone and call one of the independent distributors listed here. You'll get the best service you ever had—and the finest tubular products you can buy.

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Iverson Supply Company
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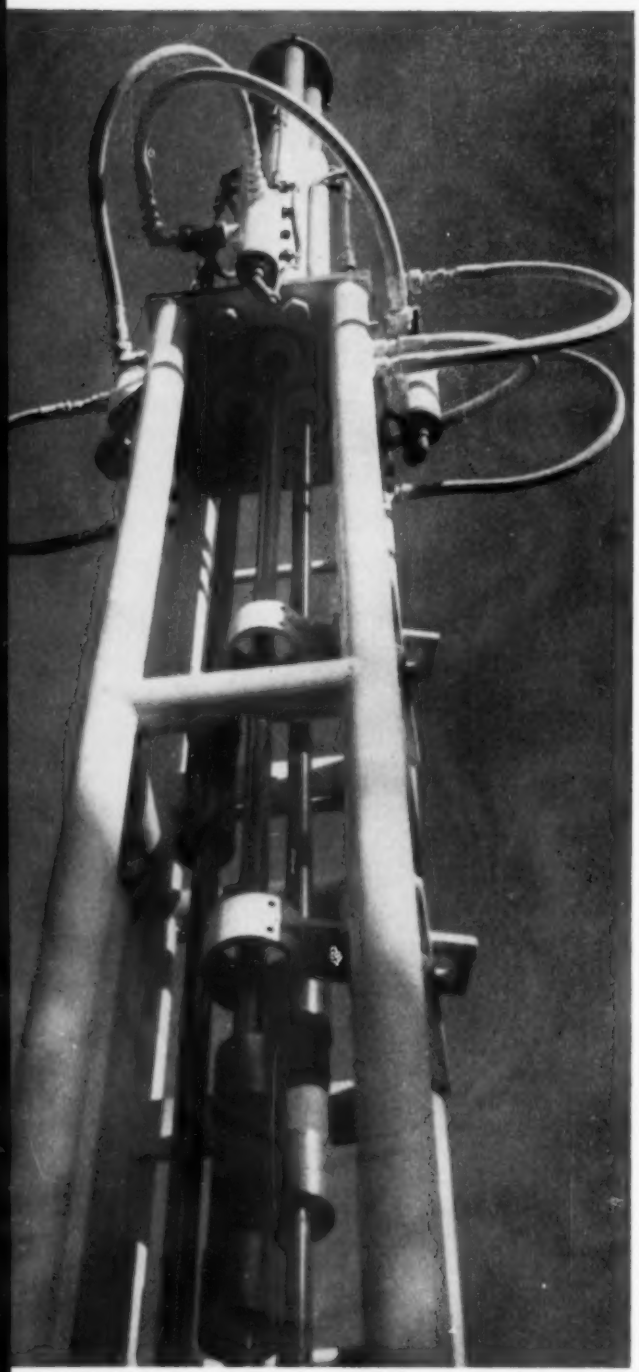
In Production, All Sights Are Set on



JOHNSTON HYDRAULIC PUMP, built by Engineered Oil Tools, is for triple completions; can be adapted for quadruples.

Operators are finding it not only necessary, but desirable, to expand use of the cost-cutting methods and tools that were pushed into effect during the post-Suez slump. There's nothing in the immediate picture to indicate a lifting of such restraints, because costs are still rising, but prices aren't. Determined efforts, in fact, are being made to find even more economic ways and equipment for producing oil and gas.

Production management has found that many of the austerity practices put into effect during last year's recession still make a lot of sense today, when the economy is in a generally vigorous upswing. One thing is sure: There's nothing to indicate that the lid is off, as far as costs are concerned.

As one chief engineer puts it: "It seems that prior to last year's recession, most people in the business had got away from the idea of saving. But now that they've found it can be done, they're going ahead with it."

In Dallas, another says: "Cost still is one of the most important items in the production picture. The price of oil isn't going up while costs are still rising—so the profit margin is still being squeezed."

While production departments, basically, are following the austerity path of the recession, many of them think they could do still better in cutting costs.

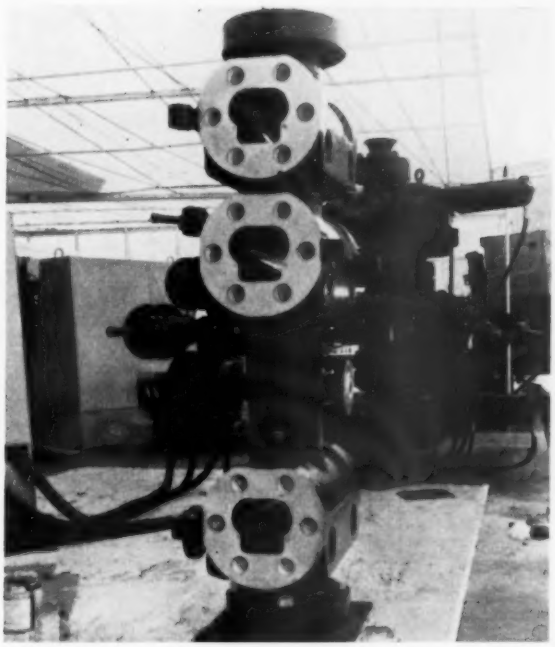
A production man with one major says his company now is considering a proposal for a full study in pure "cost control" for production.

"Production personnel have never had to consider cost control the way that manufacturers have," he explains. "Manufacturers know to the penny what it costs to turn out a product—they have to.

"You tell a production man to cut expenses, and he doesn't know how. The first thing he does is postpone remedial work on wells, in spite of the fact that management begs its production people not to cut down on the items that are so important for the future."

SPECIAL REPORT **PRODUCTION**

the Major Target: Cost-Reduction



NEW TYPE of wellhead assembly—a one-piece unit for triple completions—is now being offered by Cameron Iron Works, Inc.

ELECTRONIC COMPUTERS, like this one used by Core Labs, Inc., are being widely adapted to solution of production problems.

Many of the methods put into effect during the past couple of years have become today's standard, or preferred operating procedure.

- Companies are making sure their production items are interchangeable; standardization of equipment is a major goal.
- Oil men are insisting on better quality of materials, particularly on such things as pipe.
- Operations have been expanded without addition of personnel. Reporting work has been cut down drastically in the field and has been streamlined in the office. Excess manpower in one area has been shifted to where it was needed.
- Where it will mean a cost-saving, electric pumps are replacing gas pumps. (In Oklahoma alone, an estimated 12,000 to 14,000 wells are now electrified, with between 1,400 and 1,500 being added annually.)
- Motor-vehicle usage is under continuing study; maintenance is being stressed.
- A much closer check is maintained on equipment, and idle items are shifted where needed from a central control point. One engineer estimates that his company saved over $1-million last year with such a transfer system, instead of buying new equipment each time an item was needed in a particular place.

Service and supply companies also have felt the cost squeeze, and have done some trimming. Healthy changes have resulted.

For one thing, these companies have been hammering hard at better salesmanship, eliminating deadwood, and stressing quality.

"We all have machines and products, but what we really have to offer is quality in service," says one representative. "Educating our personnel to this fact has been quite a problem."

Another adds: "Recessions and production cutbacks have their good points. They made better salesmen and better people out of us. The operator has been forced to get more for his money, and the service company definitely has been forced to prove to the customer that the product or service will benefit the operator to an extent equal to or greater than the money he is spending."

Some oil men look to wider spacing and compulsory unitization as prime approaches to greater efficiency and cost reduction. The controversial aspects of each, however, is likely to block industry agreement.

The issue of wider spacing has been debated with increasing frequency—and fever—during the past few months. There's no let-up in sight—and no solution, either.

Where wider spacing has been adopted, money savings have resulted. Opponents, however, say this is a case in which the savings that can result do not outweigh the negative factors, such as "squeezing out the little fellow."

This argument also is heard when compulsory unitization is brought up, though opponents of the latter also invoke engineering counter arguments. For instance, it is

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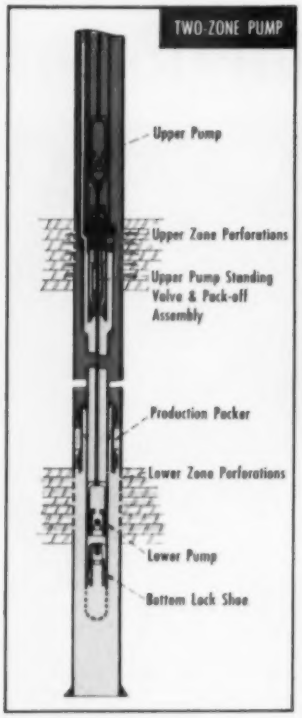

NEW PUMP DESIGNS that are making their entry include a parallel-string, two-zone pump (left) by Continental-Emsco Co., and a pump jack with a pivoting horsehead on the walking beam, for longer strokes, developed by Ross Engineering & Equipment Co.

said that too little is known about a field's limits, reservoir mechanics, and reserves during a field's early stages.

But there are several other areas—such as automatic production and custody transfer—in which considerable industry effort will be placed in the mounting attack on costs.

Great steps forward have been taken in the past two or three years in such areas as acceptance and improvement of automatic lease production and custody transfer methods and equipment.

And further important gains are believed possible in such areas as lease commingling, commingled condensate, gas gathering, revision of allowables regulations, and more uniformity in laws and regulations.

The industry can expect a gradual and continuing effort to achieve more uniformity on many of the basic rules, beginning primarily with the less controversial ones. But there doesn't appear to be much chance of a fast, complete overhaul of existing procedures.

Operators, meanwhile, are doing what they can, within the framework of existing statutes and regulations, to promote more efficient practices. One of these is "consolidation of holdings."

This practice, which shows signs of becoming even more widespread, involves the exchange of producing properties of equal value so that an operator may more easily effect a consolidated or unitized operation.

"It's a poor substitute for unitization, but it does help," says one major company spokesman.

Says another official: "Why have ten different owners and ten different lease batteries in an area where one would serve?"

This practice goes hand-in-hand with the trend toward automatic lease production and custody transfer, as well as pressure maintenance and secondary recovery programs.

New ideas and new equipment also are providing the production man with solutions to specific field problems.

There is a big swing toward tubingless completions; radiation is being applied to volume measurement; electronic wizardry continues to open new vistas; corrosion control has improved; and unusual secondary recovery efforts are being attempted.

At the same time, there is a growing awareness that insufficient attention has been paid to making existing equipment and techniques yield the maximum benefits.

Tubingless Completions Grow

The technique of tubingless multiple completions, introduced only a relatively short time ago, has caught on in a big way.

This multiple-completion method, developed by Humble Oil & Refining Co., is being used now in several areas (PW—Nov.21'58,p17). Essentially, it means cementing two or more strings of tubing permanently in place in an open hole.

Now the method is being applied by both majors and independents all across the oil patch. Stekoll Petroleum Co. has completed tubingless producers as deep as 7,800

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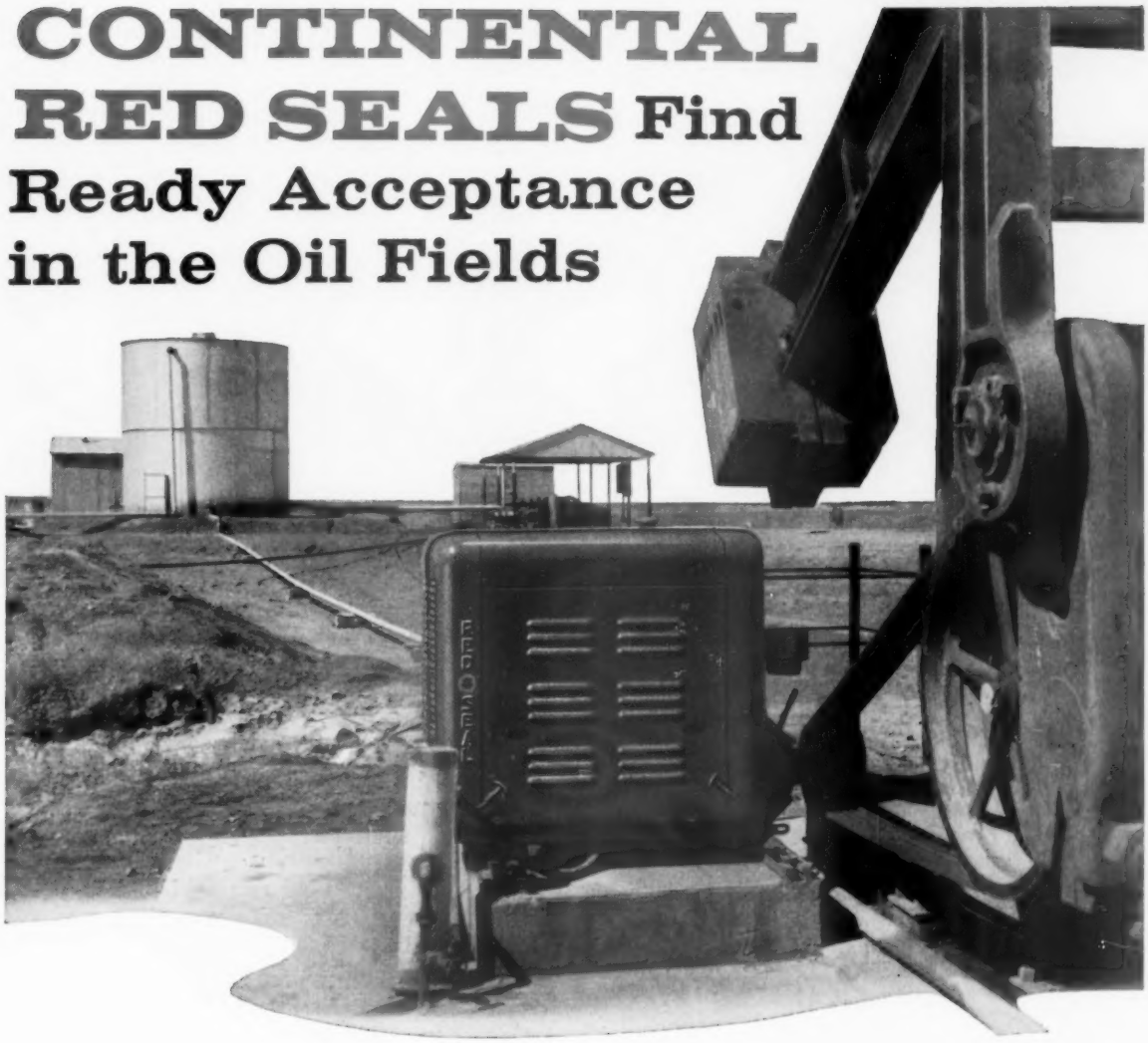
CONTINENTAL RED SEALS Find Ready Acceptance in the Oil Fields



The ever-widening acceptance of Continental Red Seal engines in all types of oil field operations is attributed in great part to specialization—in Continental's long-standing policy of engineering each model precisely to the job to be done. Each and every model is the product of 56 years' engine-building experience. The industrial series comprises 57 different basic models—from 14 to 237 horsepower—and they are backed by parts and service from coast to coast. Visit your nearest oil field supply store or write the factory for information.

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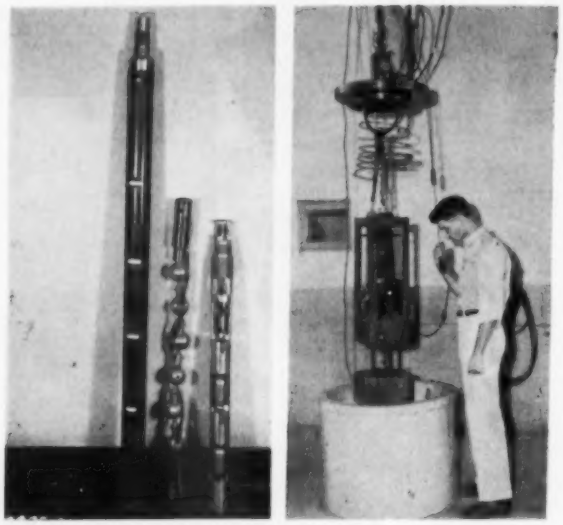

PERFORATING GUNS, developed by Jet Research Center for use in tubingless completions, are tested in pressure chambers.

'LEASE WORK HORSE,' developed by Para-Lax Corp., is used for circulating solvents through tanks to remove sediments.

ft.—none of them on the pump, as yet—and is planning to go to 8,800 ft.

One major company currently is drilling 14 outposts at a Texas tidelands field. It knows that all of the tests won't be producers, so it is utilizing a variation of the tubingless completion method to trim costs.

This operator is running 2⅞-in. tubing in the less favorable wells and cementing it in place before testing. If the test is successful, the well is completed as a producer. If it is a dry hole, however, the company has spent $32,000, rather than the $50,000 to $55,000 it would cost with a normal casing program.

This company is not alone in this practice. A Tulsa-based firm reports that running 2⅞-in. tubing, without casing, permits use of a smaller rig during drilling and considerable savings in mud and cement bills. A company production engineer estimates that these savings run about 20%; where a conventional completion would cost about $40,000, the tubingless completion costs about $32,000.

Operators report, also, that it is cheaper to clean out the smaller tubing than larger pipe. And with no tubing to pull, there are additional workover savings.

One of the key factors in tubingless completions, the "directional" perforating tool, has been improved greatly.

Previously, the problem of perforating without leaving debris in the small-diameter casings had been solved. But there was an additional problem. In a multiple completion, it was necessary to shoot the proper string of pipe "directionally" opposite the upper zones, so as not to damage adjacent strings in the borehole.

This was accomplished initially by use of an arm type mechanical orienting device above the gun, in conjunction with a special offset pocket type mandrel properly oriented and installed in the string. This meant, however, that two or more strings of pipe had to be clamped together and run into the hole in "bundles."

Now Schlumberger Well Surveying Corp., which developed the "directional" gun, has modified it into a more versatile, "self-orienting" tool. The new version employs a weak, collimated radioactive source and rotating device attached to the gun, in combination with radiation detectors suspended in adjacent strings.

As the gun is rotated, the detectors measure the variable intensity of the radiation source, thus pinpointing precisely the direction of firing.

The tubingless completion method also has stimulated development of another type of perforating gun, containing a different type of charge.

The Jet Research Center, of Ft. Worth, has just introduced the new gun, which it designed particualrly to obtain a high degree of efficiency in the 2⅞-in. pipe used in tubingless completions.

The gun is a hollow steel tube in which any resultant debris is retrieved. Jet Research says the charges used "offer a novel, and what we think is a revolutionary, approach," but isn't yet prepared to discuss this angle in detail.

The company says, however, that the gun obtains perforations and flow rates as deep and efficient as those using capsule-type charges in permanent completions with 5½-in. casing.

The center also believes that the perforator is adaptable to use in deep wells where 4-in. liner has been set on bottom and the mud used is very heavy.

Laboratory tests have shown the gun can function under pressures as great as 20,000 psi., and its normal operation specifications are for depths as great as 18,000 ft. to 20,000 ft.

Computer Uses Spread

Independent engineering firms now are following the path of major companies in making important use of electronics to solve production problems.

Core Laboratories, Inc., of Dallas, recently put into operation a system built around an International Business

continued ▶

Larkin bull plugs and swage nipples are typical of the broad line of quality equipment stocked and distributed through National's 124 stores.

This is the NATIONAL SUPPLY STORE, too!

The next time you stop in a National Supply Store, remember to shop *behind* the counter, too. You'll see quality equipment like these Larkin products, Link-Belt Chain, Ajax Engines, Oilmaster Pumps, Tube-Turn fittings, Rockwell-Nordstrom Valves, Columbian Rope and many more. Wherever you go, National Supply offers you an unmatched variety of quality products.

On the next pages:
National Multi-String Wellhead Equipment

Two National Type E-24 Pumpers operate through this National dual completion assembly, located on the discovery well of an Alabama field.

10 major reasons for using NATIONAL Multiple String Heads

1. NATIONAL Multiple String Heads are available in four basic designs to suit any requirement . . . can handle applications from low-pressure pumping to high pressure gas or oil wells.
2. Provide maximum flexibility and safety.
3. Afford *complete independence* for each producing zone.
4. Handle completion cycle in manner similar to single completion . . . using same design of equipment, but reduced in size to permit handling two or more tubing strings.
5. The Laurent seal*—"sealed-in-steel"—is used for higher pressures.
6. Hangers are self locating.
7. Simplicity characteristic of conventional equipment is carried out in the multiple string design.
8. Adaptable to other manufacturers' wellhead bodies.
9. Plastics or liquids are not required to effect the seals.
10. National's many years of engineering experience stand behind the design of the multiple string equipment.

*Patent No. 2,687,229

Get the details behind each reason from the National representative in your area now. And remember . . .

You always get these advantages with any type of National Wellhead Equipment

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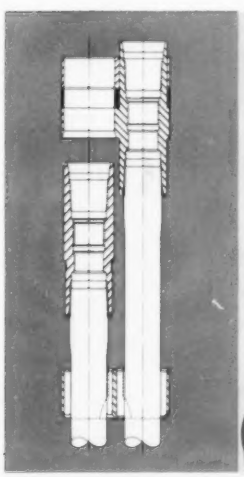
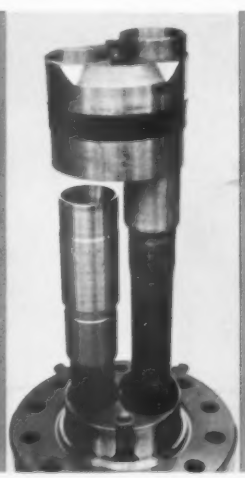
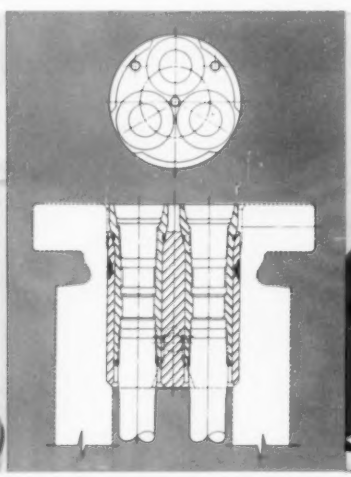
Maximum flexibility
Pre-tested safety
Readily available stocks
Experienced advisory service





NEW ADDITION TO NATIONAL LINE—Type DP-4 dual string wellhead equipment† is rated at 10,000 psi working pressure. It permits "controlled completions" through standard preventers. Retrievable mandrel gas lift valves can be run on either tubing string, and either tubing string can be pulled without disturbing the other.



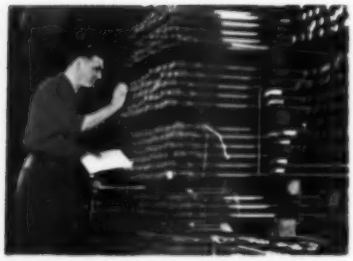
TRIPLE-STRING WELLHEAD EQUIPMENT†—National Type TP-1, rated at 5,000 psi maximum working pressure. This hanger allows a triple string completion to be made with complete preventer control at all times. The TP-1 hanger is used in the DP-4 tubing spool to provide maximum flexibility.

†Patent Pending

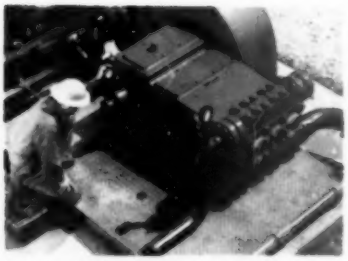
More on the next page . . .

A National Type E Long Stroke Pumping Unit in operation in California. National Pumpers are available in 13 basic sizes, with more than 90 standard specifications in beam and crank counterweighted types. There's one to suit any pumping need you may have!

Your best buy for every recovery method— NATIONAL production equipment!



Get reliable service from precision-made National Sucker Rods. They have top resistance to fatigue, shock, corrosion and impulse loads. Available in a range of grades to meet every well condition.



National Triplex Pumps are reliable on a host of oilfield pumping jobs including waterflooding, salt water disposals, formation fracturing, and as power-oil sources for sub-surface hydraulic pumps.

National Plunger Lift can be the best production method for certain types of wells. It uses formation gas or injected gas for operation, has low initial and service costs. Equipment is also available for gas well operation to remove liquids and maintain a uniform and increased flow rate of gas.

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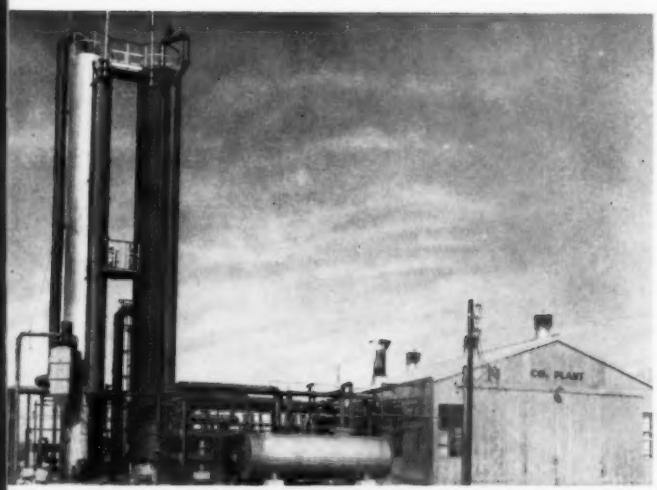

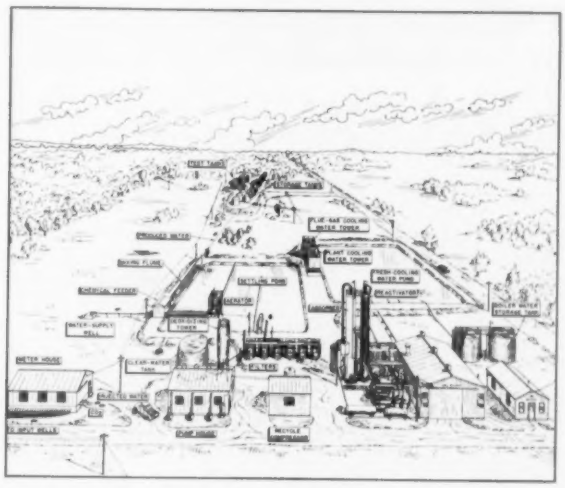

CARBON DIOXIDE PLANT (left) is a key unit in an unorthodox, carbonated-water secondary-recovery project being carried out by Oil Recovery Corp. on a 240-acre lease near Dewey, Okla. Project layout (right) is from U.S. Bureau of Mines report.

Machines 60 magnetic drum data processing machine designed specifically to work out production and engineering problems.

In addition to the accompanying card-punching and card-sorting machines, Core Lab has a Librascope Punched-Card Converter, which plots given information from the cards on an "x,y" grid sheet.

This converter speeds up the process of information evaluation by presenting results visually.

"The system doesn't perform any miracles, but it lets you make so many different calculations," explains a company official. "It gives you exact results—not approximations—and, actually, figures for you the best way to do something. It cuts down on the guessing."

Core Lab's biggest immediate problem is the programing of calculations it wishes the system to make. The company now is building a library of problems applicable to reservoir engineering calculations.

As an example of what can be done with the system, Core Lab recently worked out 1,000 pump-design calculations within three hours; by manual calculations it would have taken two engineers two hours to complete just one full calculation.

But that was only part of the value of the computer work on this problem. After the designs were worked out, a family of curves was plotted electronically to fit optimum conditions."

"If we had been doing this by hand, we couldn't have looked at all the conditions," says an engineer. "We'd have had to decide what conditions to plot. But with the calculator, we were able to look at all of them and come up with the best possible design to fit the optimum conditions."

Some reservoir engineering jobs would be impossible without electronics.

Probably the most extensive job tackled by Core Lab with the calculator so far dealt with the Wilmington field, Long Beach, Calif.

Two-million production data cards had to be punched on this one field. The job involved a 20-year production history on 4,000 wells in the multizone field. The cards incorporated such data as the number of wells, the oil-gas-water production, oil-gas ratios, and the like.

With use of the calculator, wells could be grouped, permitting an otherwise unattainable amount of correlation and analysis of performance for all reservoirs in the field.

"It would just be impossible to compute all this by hand," says a Core Lab official.

Needed: Better Oil Recovery

The application of unusual secondary recovery methods continues. Several new thermal recovery operations, for example, are being watched closely.

One of the more interesting current projects is the in-situ combustion project Standard Oil Co. of California has going in the Surf lease, Huntington Beach field, Orange County, Calif.

The 100-acre lease has a "fairly thin" pay zone at about 4,000 ft. Crude is 20-gravity. Stancal, which is using one injection well and five producing wells, says it is still too early to draw any conclusions.

One of the most recent thermal recovery programs to get under way is a Coleman County (Tex.) project. It has a particularly interesting feature.

The test, by John DeFord, Trustee, on the Knight lease, is the first attempt to conduct in-situ combustion operations in a depleted field with a high water saturation (above 50% of pore space).

Air injection began early this year, with ignition accomplished in April. Tejas Petroleum Engineers, technical supervisors, say it is too early for evaluation of this program.

Tejas says that permeability of the 150-ft.-deep formation, however, is sufficiently high to permit the injection of air "at rates adequate to support the slowly-moving burning front."

Tejas also is conducting the new program in the Carrizo-Wilcox sands of Anderson County, Tex., which has

continued ▸

ON MUD LINES –

Chiksan Swivel Joints speed hookup – absorb vibration

Installed on mud lines, Chiksan swivel joints perform two jobs. During rigging up, Chiksan joints allow for misalignment, speed pump positioning. When the rig is running, Chiksan joints flex with line flow surge and vibration eliminating any possibility of line rupture. What's more, Chiksan joints last longer and are easier to maintain. Chiksan joints with their partner, Weco unions, are stocked by supply stores all over the free world. It will pay you to standardize on Chiksan swivel joints on your rig. Their original cost is quickly repaid thru faster hookup, longer wear and less attention.

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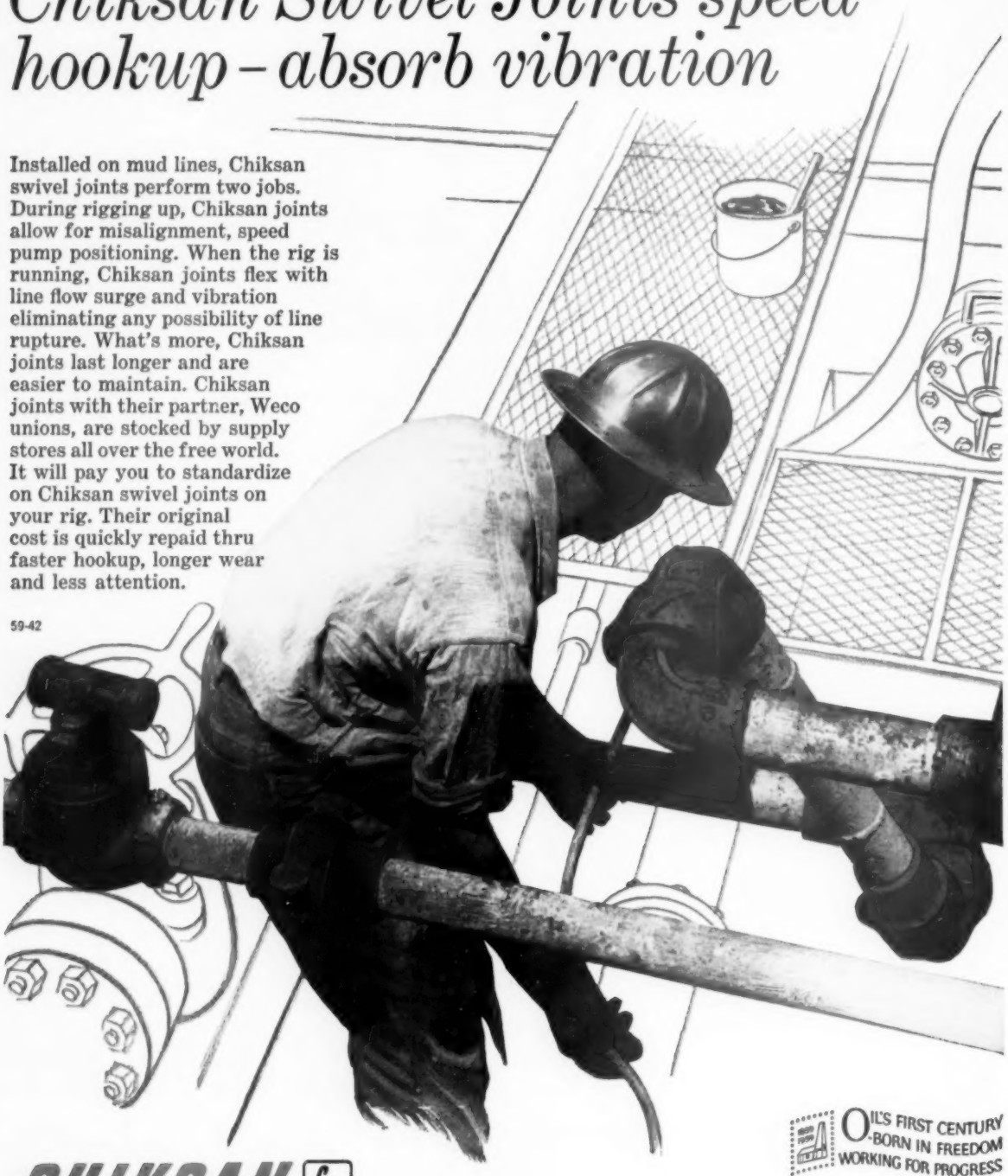

OIL'S FIRST CENTURY
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been under way for about four months. So far, Tejas reports, efforts to produce the shallow, viscous crude in this area "have been very encouraging."

Production from the only commercial carbonated-water secondary-recovery operation in the country—in Washington County, Okla.—has exceeded 30,000 bbl. monthly.

Oil Recovery Corp., of New York, with Wellsville Oil Co. as operator, has been conducting the project in the Bartlesville sand section on a 240-acre lease near Dewey, Okla., for more than a year.

The flood is being carried out on a conventional five-spot pattern with ten-acre spacing. Production is from a 33-ft. sand section, with average porosity of 17% to 18% and permeability of about 50 millidarcys.

The Bartlesville sand in Washington County is topped at about 1,300 ft. Injection of Arbuckle water from two supply wells on the lease was commenced in February, 1958. Injection of carbon dioxide was begun the following April, with the first production "kick" noted in July.

Presently, 16,000 bbl. of Arbuckle water plus a small amount of cycled Bartlesville water are being injected each day into a total of 35 input wells. Thirty tons (approximately 600,000 cu. ft.) of CO_2 are injected into the formation daily.

Peak production for the project hasn't been reached yet, according to Oil Recovery Corp. officials. The 30,000 bbl. produced in April compares with 25,000 bbl. in March, and 14,000 bbl. in January. There are 15 active producing wells on the lease now, and nine other existing wells will be activated soon.

Prior to commencement of the carbonated waterflood, production for the lease was 1,000 bbl. of oil per month from 12 wells.

Several advantages are claimed for the unorthodox carbon-dioxide method of flooding.

Oil Recovery says the process has four main advantages: (1) increased injectivity; (2) shorter flood life and a faster payout; (3) greater recovery of oil originally in place; and (4) a lower water-oil ratio from producing wells.

"One of the most significant factors," says R. J. Christensen, Oil Recovery district engineer, "has been the response of the producing wells to carbonated-water injection.

In each case, the wells have responded with less cumulative water injection than exhibited by conventional floods in this area, and a solid oil bank is indicated in a majority of the wells."

Peak single-well oil production from a conventional waterflood in the Bartlesville-Dewey area has been about 50 b/d, according to Christensen.

"But our peak single-well response using the Orco process was 200 b/d, as of May 1," he adds.

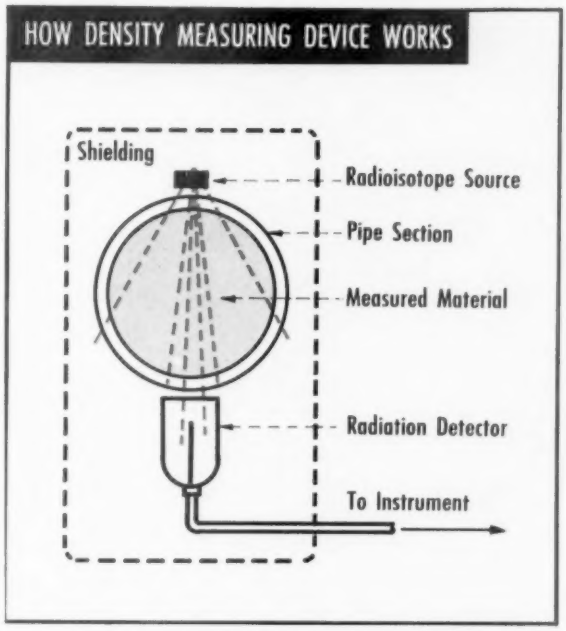
Average water-oil ratios for conventional Bartlesville floods have been on the order of 3:1. But Oil Recovery's 200 b/d well produced only 4 b/d of water.

Results so far indicate that the carbonated-water method might be the answer in areas where acceptance of water by injection wells is a problem.

"It is our belief that the conventional flood in this Bartlesville reservoir exerts a dragging action, rather than the solid frontal push we have observed with carbonated-water injection," Christensen observes.

Oil Recovery reports that it is injecting 600 b/d of water under 250 psi. surface pressure into each of the 15 inside wells on its Dewey lease. Half that amount (300 b/d) is being injected into the 20 edge wells.

Operators on adjacent leases reportedly have been able to inject only about 200 b/d of water into the same formation at pressures ranging from 500 psi. to 1,000 psi. Oil Recovery engineers conclude that their process may open the way in other problem areas, where floods have been curtailed by refusal of injection wells to accept water.



'ACCURAY' DENSITY MEASUREMENT SYSTEM is based on absorption of radiation by the material being tested, as shown.

A flood life of five to six years is anticipated for the project. Peak production is expected some time this winter, after which a gradual decline curve is foreseen.

Laboratory tests prior to the initiation of the Dewey flood indicated that, under ideal conditions, residual oil following flooding with carbonated water would be reduced to less than 10% of pore space.

Ultimate recovery on the Oklahoma project is expected to approximate 75% of the original oil in place, including both primary and secondary removal.

Although it is anticipated that the percentage of recoverable oil will vary from project to project, Oil Recovery believes that its process will give consistently higher recovery ratios than conventional waterflooding.

Christensen says Oil Recovery has about $400,000 tied up in facilities for the CO_2 project. This investment includes the carbon dioxide plant itself, plus water-cooling apparatus, recycle compressor, metering system, and distribution lines and downhole tubing strings.

The plant employs a conventional CO_2 manufacturing process, in which natural gas mixed with air is burned under a water-tube boiler and the carbon dioxide stripped from the resultant flue gas through use of monoethanolamine. Heat produced in the process is used for the produc-

continued ▶

CONVERTIBLE ELECTRIC MOTOR on this pump can be used on one- or three-phase current. It's a Continental-Emsco product.

'ACTUATOR' PUMP developed by Parkersburg Rig & Reel Co. is all-electric and is said to have an almost unlimited stroke.

tion of steam which, in turn, powers the compressor, blower, and reboilers.

About 600,000 cf/d of natural gas are required to operate the project's 30-ton carbon-dioxide plant at capacity.

One quarter of this natural gas is produced from a company-owned gas well north of the project, with the remainder being purchased from Cities Service Gas Co. at the rate of 25¢ per Mcf.

All injection wells are cased to top of pay with 2½-in. cement-line steel pipe, and a ¾-in. macaroni string is run inside the casing.

Water injection is through the annular space; CO_2 injection is through the macaroni string. Mixing occurs at the pay face, and carbonated water is forced into the producing formation.

Producing wells are cased to top of pay with standard 7-in. steel pipe. Open hole is shot with 60 qt. of nitro in the producing wells, but the exposed section in the input wells is not shot.

The patented Orco process is essentially a two-stage flood. Injection of carbon dioxide is begun a short time after water injection, and lasts for about one year.

This is an arbitrary length of time at present, and may be varied (probably downward) if additional data dictates.

At least nine wells in the Dewey project already have received CO_2 for the specified period of time, and have been receiving water alone for some time. No decrease in the rate of injectivity has been noted.

Oil Recovery engineers have worked out a series of graphs based on formula to indicate how much CO_2 should be injected in proportion to the volume of water going into any given well.

Salinity of the injected water and formation temperatures are two major considerations. Precise ratios, Christensen says, are confidential information.

Although such secondary recovery methods as the thermal and carbonated-water techniques are considered unorthodox today, even more unconventional methods are sure to be tried in the near future. The search for a breakthrough on this front is intense.

As the chief engineer for one major remarks: "The industry shouldn't be satisfied with anything less than 80% recovery of the oil in place. No company—mine or anyone else's—is happy at leaving 50% to 60% of the oil underground."

This particular company currently is putting a major research emphasis on finding "a major breakthrough" in secondary recovery.

Another major shortly will initiate a project using inert gas as a driving agent. This gas reportedly will be 88% nitrogen and the remainder carbon dioxide.

And at least one major is considering the use of hot water. The project suggests that the water can be heated to approximately the temperature achieved in the in-situ combustion method—but that the procedure would be considerably less expensive than either in-situ combustion or miscible gas injection.

Along this line, the widely-discussed plan to use an underground nuclear blast to produce oil from shale cannot be overlooked. The test may come next year.

It seems evident, at this stage anyhow, that the project will not be an immediate cure-all. This is one of the significant conclusions drawn from the May "Project Plowshare" symposium in San Francisco (PW—May22 '59,p12).

Edward Teller, the "father of the hydrogen bomb," told the Fifth World Petroleum Congress in New York that "It is much easier to release energy uncontrolled than to control it."

But industry and government are getting closer together on the methods, financing, and other aspects of the test.

The first test shot will be set off in Colorado oil shale, according to present plans.

Walter I. R. Murphy, of the Laramie Petroleum Re-

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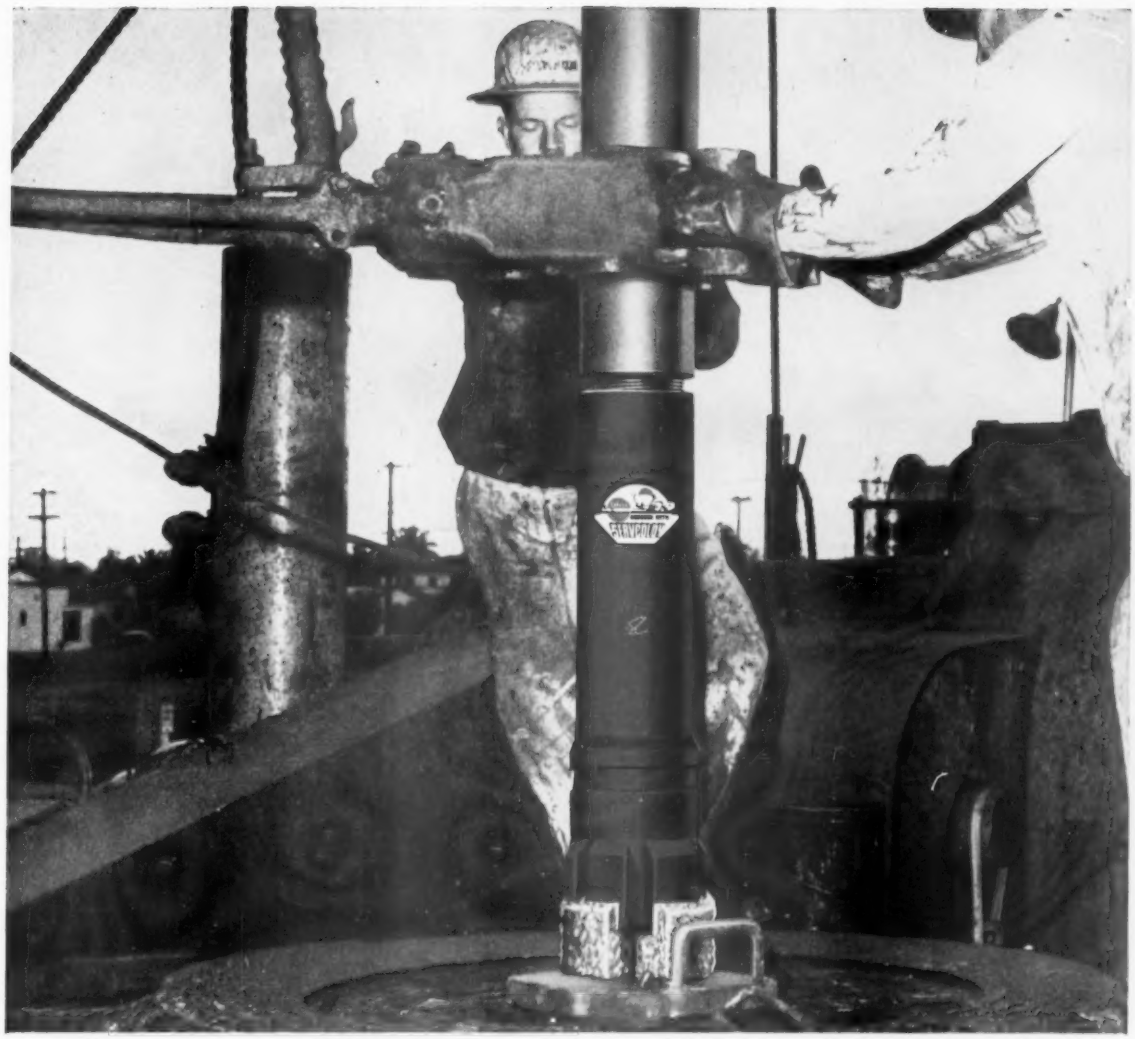

Three 6⅛″ Bit Cones milled up in 2 HOURS!

Servcoloy-dressed Junk Mills chew up bit cones and other junk with amazing speed; makes this method of removing a fish fast, safe, and very economical.

After three cones from a 6⅛″ bit were left on bottom, two rock bits, two hydro-bailers, and two junk baskets were run during a three-day period in attempts to either recover or sidetrack the three cones. Results were negative.

A six-inch Servco CJ Junk Mill dressed with Servcoloy, was then run in the hole. A total of two feet of hole was drilled in a period of two hours of milling. The operator ran back with a bit and proceeded to drill a head. Fine steel cuttings were caught on the shaker during the milling and appeared on the mud screen during the succeeding day, showing that the *cones were actually milled up, not sidetracked.*

Other operators running the Servco Junk Mill report similar results. The astonishing cutting properties of Servcoloy have completely changed thinking about down-hole milling. Why not get complete information from your nearest Servco office?

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Servcoloy is a patented, hard-facing material which uses a unique method of suspending bits of carbide in a tough, elastic matrix. As the carbide cutting edges are worn away or torn from the matrix, new edges are automatically exposed. Servcoloy is now being used on Servco milling tools such as section mills, rotary shoes, taper mills, pilot mills, etc. Remedial work which formerly took days to do is now being done in hours.

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search Center, says the tentative test site is in the Mahogany zone, an 80-100-ft.-thick segment of the Green River formation in Garfield County, Colo.

The precise site, however, won't be selected until an additional study is made "to assure public health and safety."

It's agreed that production of the oil by in-situ combustion after a nuclear explosion will be much more of a problem than the blast itself.

Murphy says the petroleum industry's experience with in-situ combustion should be helpful. The economics in fire-flooding petroleum reservoirs, he notes, are oil saturation, pressure gradient in relation to well spacing, efficient utilization of heat, the recovery and use of the thermal energy of produced gases, the duration of the project, and, the most important factor, the cost of compressing air for injection.

If all the heat released by the nuclear blast were utilized in heating shale to a retorting temperature of 900F, it would be enough to produce some 10-million cu. ft. of gas and 15,000 bbl. of shale oil, Murphy estimates.

But since this "perfect situation" wouldn't last, the recovery would be somewhat less, he adds.

Insofar as economics are concerned, the government estimates that shale oil can be produced for between $2 and $3 a bbl. (PW—Apr.3'59,p32). Recovery is estimated at 47% of the oil in place.

The government also is looking into the requirements for nuclear blasting of a petroleum reservoir, though these studies haven't advanced as far as those concerning shale oil.

Most likely candidate for such a project would be a reservoir with 100 ft. to 200 ft. of formation highly saturated with very viscous crude—precisely the type of reservoir thought most likely to respond to ordinary in-situ combustion.

In a reservoir containing a viscous or waxy crude, says Carl C. Anderson, the Bureau of Mines, chief petroleum engineer, "both the fracturing and heating characteristics of a nuclear explosion can be used to good advantage."

He says that half of the total energy of the explosion might be retained in the formation as heat, stimulating production and effecting "a substantial increase in recovery."

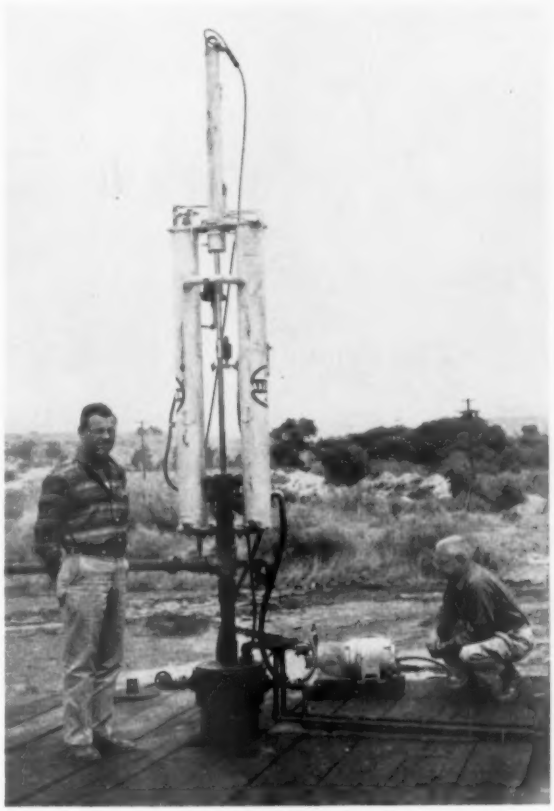
The main problem in developing peaceful uses for atomic explosives is in finding small enough bombs to be useful and in controlling fallout, Teller says.

Some work has already been done on the fallout problem, and clean explosions may in time be possible, he said. But study of both nuclear bomb size and radiation effects in industrial use is somewhat limited by present security regulations, he added.

Teller noted that, in underground explosions, some of the radiation created can be carried off by underground water. He said strontium 90 produced by the underground explosion probably would be left behind by the water, however.

But no matter what new kinds of secondary techniques crop up, the standard waterflood will be around for a long time. This method is being applied now on an increasingly large scale in areas where its uses had lagged previously.

California's first waterflood was initiated by Union Oil Co. of California in February, 1947. By the end of 1958,



COMPACT HYDRAULIC PUMP by Axelson Mfg. Co. has a 2-ft. stroke. This experimental unit can be set up in an hour.

Union had spent some $7.2-million in developing and operating 18 such floods in the state, accounting for production of 5¼-million bbl. of oil unrecoverable by primary methods, with another 5-million bbl. yet expected to be recovered.

"This is the equivalent of 10-million bbl. of low-cost oil added to our producible oil reserves," says A. C. Rubel, Union president.

"We are planning waterfloods in all divisions where conditions are favorable. Such operations have a potential yield estimated to be 54-million bbl. of oil, to be produced from 19 separate waterfloods now in the planning stage."

There are now some 65 waterfloods in California. These involve injection of over 500,000 b/d of water—including the huge Wilmington field program, where some 210,000 b/d of water are being pumped into various pay zones through 45 injection wells.

Similarly, waterflooding in the Permian Basin of West Texas is continuing to grow at a rapid pace, although operators say there is a tendency now for the Texas Railroad Commission to take a closer look at waterflood applications (waterfloods are permitted a much higher withdrawal rate in Texas).

In North Texas, waterflooding in a significant way is

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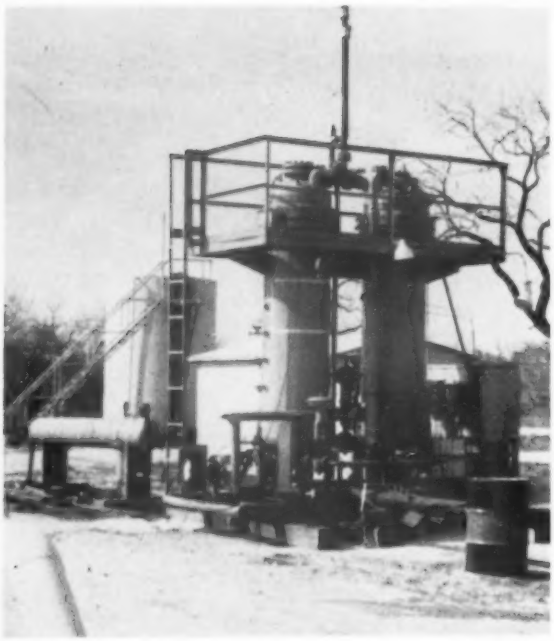
GLYCOL-TYPE GAS DEHYDRATION UNIT, Sauder Tank Co.'s 'Unidryer,' can be used under a wide variety of conditions.



SELECTIVE ADSORPTION UNIT from Maloney-Crawford Tank & Mfg. Co., mounted on two skids, is for small leases.

just getting started. One independent notes that his firm, producing some 6,000 b/d of crude, is getting only about 100 b/d of "flood oil."

"But we're going to waterflood," he says. "Waterflooding is really going to start up around here before long. The recoveries won't be astronomical, because the sand in this country is pretty tight, but they will be money-making. This is sort of an ace-in-the-hole people around here have been saving."

The superintendent and general manager for one large North Texas independent estimates that waterfloods either have been started or are being planned for between 15% and 25% of the entire producing area.

Pumps Get Design Changes

Various new approaches are being made to the chronic problem of pumping wells better—one of the production man's prime headaches.

Production personnel have been shooting for several goals ever since they began to pump wells with sucker rods. These goals include less wear-and-tear on rods and downhole equipment; better methods of governing the pumping rate; a reduction of downhole troubles due to pump turbulence; higher efficiency; and so on.

Several improvements have been made in conventional pumping equipment, too.

Continental-Emsco Co., for example, has redesigned its two-zone pump to permit the pumping of two zones independently.

The major design changes include the cross-over system, the standing valve, and the packoff assembly. These changes provide much greater flexibility, so that remedial work can be undertaken in one zone while the other zone continues producing. The new pump also is applicable in wells where it is desired to produce three separate, isolated zones independently.

On the prime mover side, General Electric has developed a new line of motors "with electrical characteristics designed specifically for oil well pumping," with ratings ranging from 5 hp. to 60 hp.

GE says the new line of motors boasts a higher starting torque, permitting smaller power units for pumps that have high starting loads.

These are only two of the many improvements now available for lease pumping equipment. Many others were displayed at the recent International Petroleum Exposition (PW—May22'59,p14).

One new interesting pump jack design involves a pivoting horsehead on the walking beam to achieve a longer stroke.

A new version of the unit—the Reeco Pumper—is being built now by Levingston Shipbuilding Co. for the developer, Ross Engineering & Equipment Co., Wichita.

The horsehead is connected by a link member at the rear of the head to the walking beam and the bottom of the samson post. As the beam moves, it causes the head to pivot or rotate, thus carrying the sucker rod string through a longer stroke. For example, for a 50-in. stroke, the beam would travel 22 in. vertically, but the rotation of the head would add another 28 in.

One model, tested on a Cowley County (Kan.) well for several months, reportedly used only one-quarter the horsepower needed by a previous conventional pumping unit.

Several bold ideas on well pumping have come to the fore in a rush. The Sonic Pump may get into full produc-

STRIPPER-LEASE AUTOMATION is done by this unit on an 80-acre Sinclair Oil & Gas Co. lease in Eastern Oklahoma. The company-designed system is presently handling about 40 b/d of oil, underscoring the trend to units specially sized for small leases.

tion by the end of the year if an exhaustive field development program now going on pans out satisfactorily.

This type, which pumps by oscillation and sound waves, has been put into the field at various Southwest locations for an extensive development program.

As of now, the results of this program are inconclusive. Johnston Testers, of Houston, has been experimenting with such widely varying sets of test conditions that, as one official remarks: "The results in most cases have been the function of the experiment."

The testing so far, however, reportedly indicates that the pump "can handle as much or more volume of liquids as a comparable conventional pump" and that it has considerable ability to handle sand.

Hydraulic pumping has not only caught on well, but new designs and improvements have been significant.

During the past half-dozen years, the number of these units in the field has jumped from a handful to several thousand, with several firms now manufacturing them.

The chief advantages claimed for such units include a long, slow stroke; more precise control of the pumping rate; and relative economy.

But just during the last year, there have been some changes in design and construction of such pumps that have increased their flexibility and applicability. Recent emphasis has been on savings in weight.

Experimental models of small, 2-ft.-stroke hydraulic units are in the field.

Both Axelson Mfg. Co. and Pacific Perforating Co. have built such models.

One major company has three of the units on wells in the Kern Front and Kern River fields, Kern County, Calif. This operator says the units account for savings of $200 to $300 in initial installation cost over conventional pumping units, or almost 30%.

They are so compact and transportable that a small crew can put one of the units on a well in an hour. The operator says the units have reduced maintenance costs.

One of the units was installed and operated successfully on a stripper well that couldn't be produced commercially with a conventional pumping unit, the company says.

The units reportedly will be ready for general marketing in the near future.

One example of an entirely new concept is the all-electric experimental model developed by Parkersburg Rig & Reel Co.

Like the Ryson Pumping Unit (PW—May29'59,p32), the Parkersburg pump represents a completely new idea in well pumping.

Here's how the Parkersburg unit works: A ball bearing nut similar to the steering gear on an automobile is activated by a small electric motor through a bevel gear arrangement. The gear as it turns forces a screw to ascend, pulling the polished rod to the top of its stroke.

When the screw reaches its top position, the motor is cut off automatically and the rod descends under its own force (pulled down by the weight of the sucker rods). The rate of descent is controlled by a piston cylinder equipped with a manually-controlled needle valve. The screw is oil-cushioned at the bottom of its stroke.

A variable time-delay switch is activated by hydraulic pressure to turn the motor back on when the stroke bottom is reached, thus repeating the pumping cycle.

Parkersburg says the variable time delay is important to the operation, as it gives the pump added flexibility in

continued ▶

pumping heavy, viscous crudes where fill-up time (in the borehole) is unusually slow.

The Parkersburg "actuator" pump, as it is called is said to have an almost unlimited stroke length. Models already have been built with strokes up to 40 ft.

The manufacturer says the maximum feasible length of stroke and the maximum depth are governed primarily by the strain that can be placed on sucker rods.

The experimental pump, which is to undergo extensive field testing, has already been tested experimentally in the laboratory under simulated field conditions. In tests of this nature, the pump has been found capable of performing lifting jobs normally assigned to standard pumps up to ten times its weight and size.

Because of its relative compactness, the pump is expected to be applied largely in those areas where weight and size are limiting factors, such as offshore, in the Louisiana bayou country, and in the Canadian muskeg.

Small Leases Are Automated

It's now accepted that small leases, as well as large ones, can be automated economically.

This development, pointed out by PETROLEUM WEEK many months ago as a coming trend, has now grown to a point where it probably will be an accepted field practice in the near future.

As the chief petroleum engineer for a Mid-Continent major points out: "When lease automation was first getting started, it was believed that the systems had to be so elaborate that they couldn't be placed economically on anything except a large lease.

"But now it is becoming evident that, if they can be put on a big lease and yield big savings, they can be designed and built for use on a smaller lease and result in proportionate cost reductions."

Manufacturers, in fact, have had to move fast to keep up with the trend.

One equipment company told PETROLEUM WEEK that it has embarked on a "crash program" to fabricate a low-cost automatic custody transfer unit.

Others, of course, have had relatively inexpensive, skid-mounted units on the market for some time, and various operating companies have designed and put into field service their own versions.

One type of unit, manufactured by Murdock Tank & Mfg. Co., delivers in Tulsa for $5,500 to $6,400, depending on the monitor selected. The unit is designed to handle from 3 b/d to 500 b/d, which Maynard Jackson, of Murdock's custody transfer systems division, says "fits into a category covered by roughly 50% of the production in the country."

The skid-mounted tank unit has a 3-bbl. positive displacement meter tank and a 10-bbl. receiving tank for pipeline delivery, and can be used with a surge tank or a heater-treater with a combined surge compartment.

Another recent design is the Parkersburg-Major MACT unit, which comes in various capacity sizes from 720 b/d to 21,600 b/d. The smallest unit is only 2 ft. wide, 8 ft. long, and 6 ft. high.

This trend also is significant in view of possible savings on stripper well production, a production factor that continues to grow in importance.

Stripper production in the U.S. has been climbing steadily, and now accounts for almost 18% of domestic crude output.

ONE-SKID UNIT for automatic custody transfer, designed by Cities Service Oil Co., will cut moving, installation costs.

Because pipelines normally require weekly gauging on manually operated leases of this nature, there is substantial weathering and vaporization of the crude in tanks. This also means that additional tankage is frequently needed.

On the other hand, properly sized and inexpensive automatic custody transfer units could eliminate much of the loss and probably make such operations more economical in other ways.

In eastern Oklahoma and Kansas, for example, several operators have gone this route. Typical of this development is the recent installation by Sinclair Oil & Gas Co. of an ACT unit on a 19-well stripper lease.

Sinclair's engineers recently completed the installation 3 mi. east of Kiefer, in the old Glenpool area. The company's fee-owned Winona Consolidated lease, on which the unit was placed, has been producing since around 1908.

Daily production from the 80-acre lease now averages about 40 bbl. of 37-gravity sweet crude. All producing wells are on pump, with jacks motivated through a shackle rod hookup from a central power source.

Sinclair's company-designed system is unusual in several respects, not the least of which is the fact that a major company has come up with a means of licking a "poor boy" production problem.

Helping to carry out the company's theme of doing the

continued ▶

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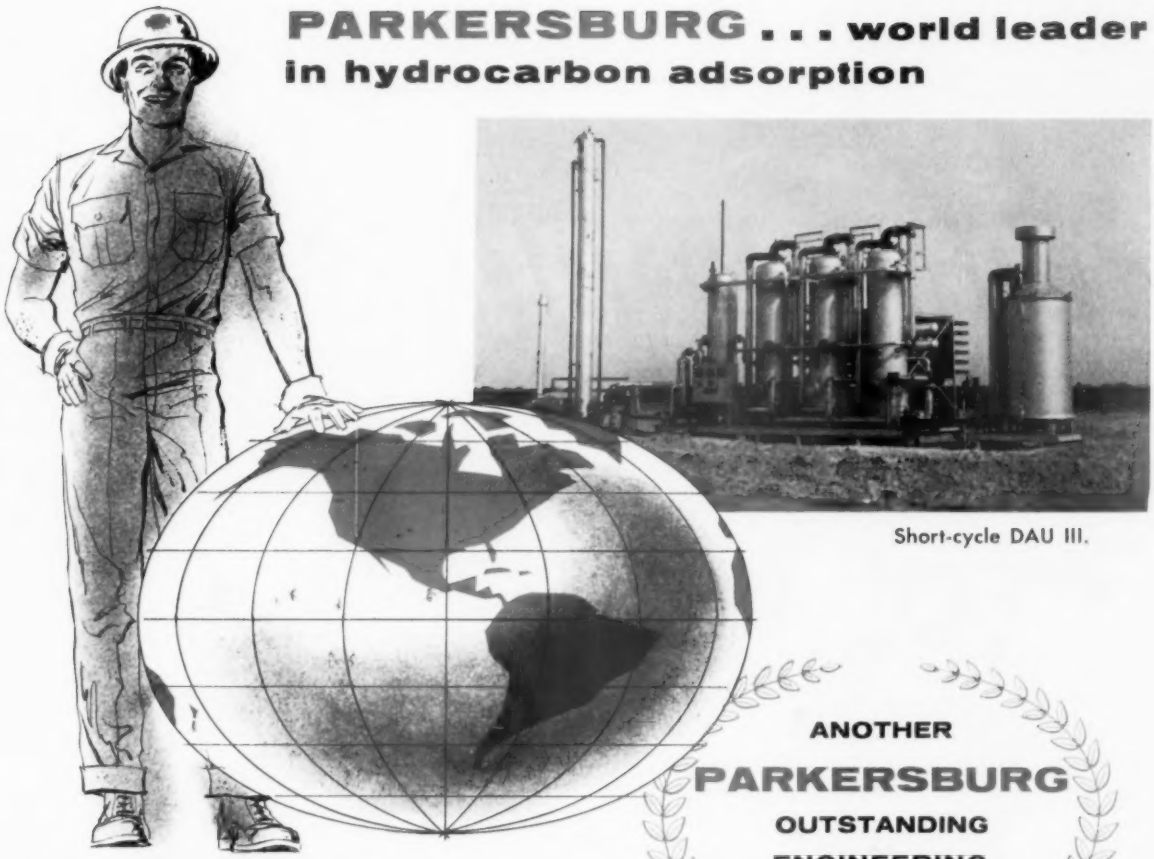

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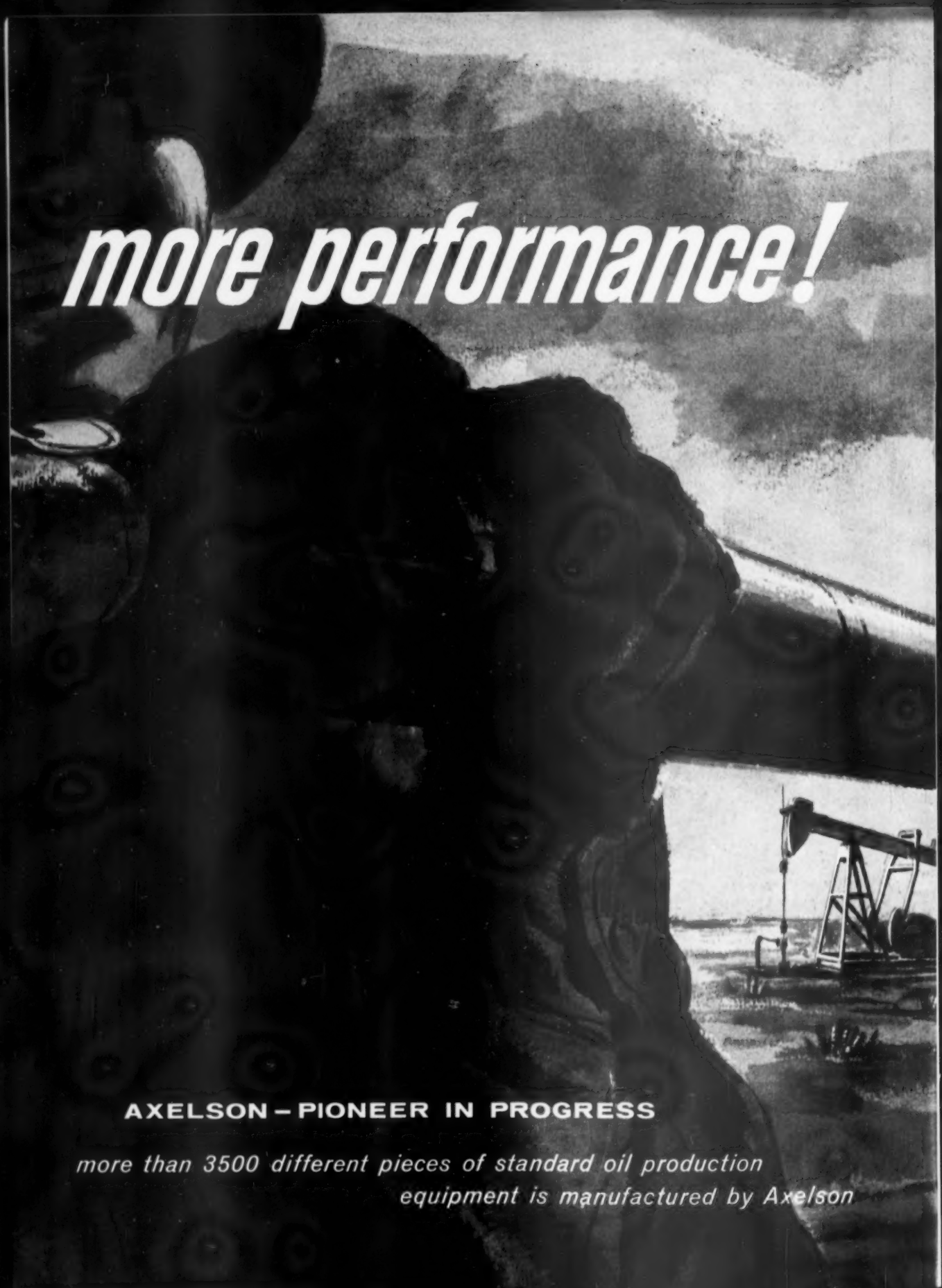
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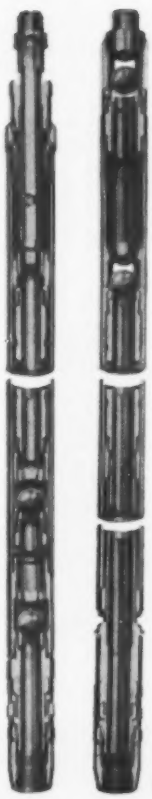
The Axelson "Sure Seal" RWA, RWB, and RWT are the most widely accepted pumps in the Axelson line. This popularity is contributed in part to these features: Economy; complete interchangeability of parts; long dependable service; and the variety of plunger and tube combinations available.

RWB – This "Sure Seal" (Bottom Hold Down) pump with stationary barrel is available with either 3-cup Hold Down Body Assembly (for seating nipple) or API Bottom Lock Mechanical Hold-Down (for mating shoe in tubing string).

RWA – This "Sure Seal" (Top Hold Down) pump with stationary barrel is preferred where sand and gas are present. Available with Top Hold-Down or Axelson Mechanical Top Lock Assembly, the pump provides improved gas separation and free entry of fluid into the producing chambers.

RWT – This "Sure Seal" traveling-barrel type pump is available for operators who prefer the traveling-type pumps for their particular well condition.



RWB RWT

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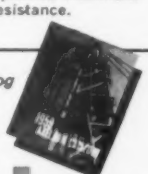
Write for 1959 Axelson catalog



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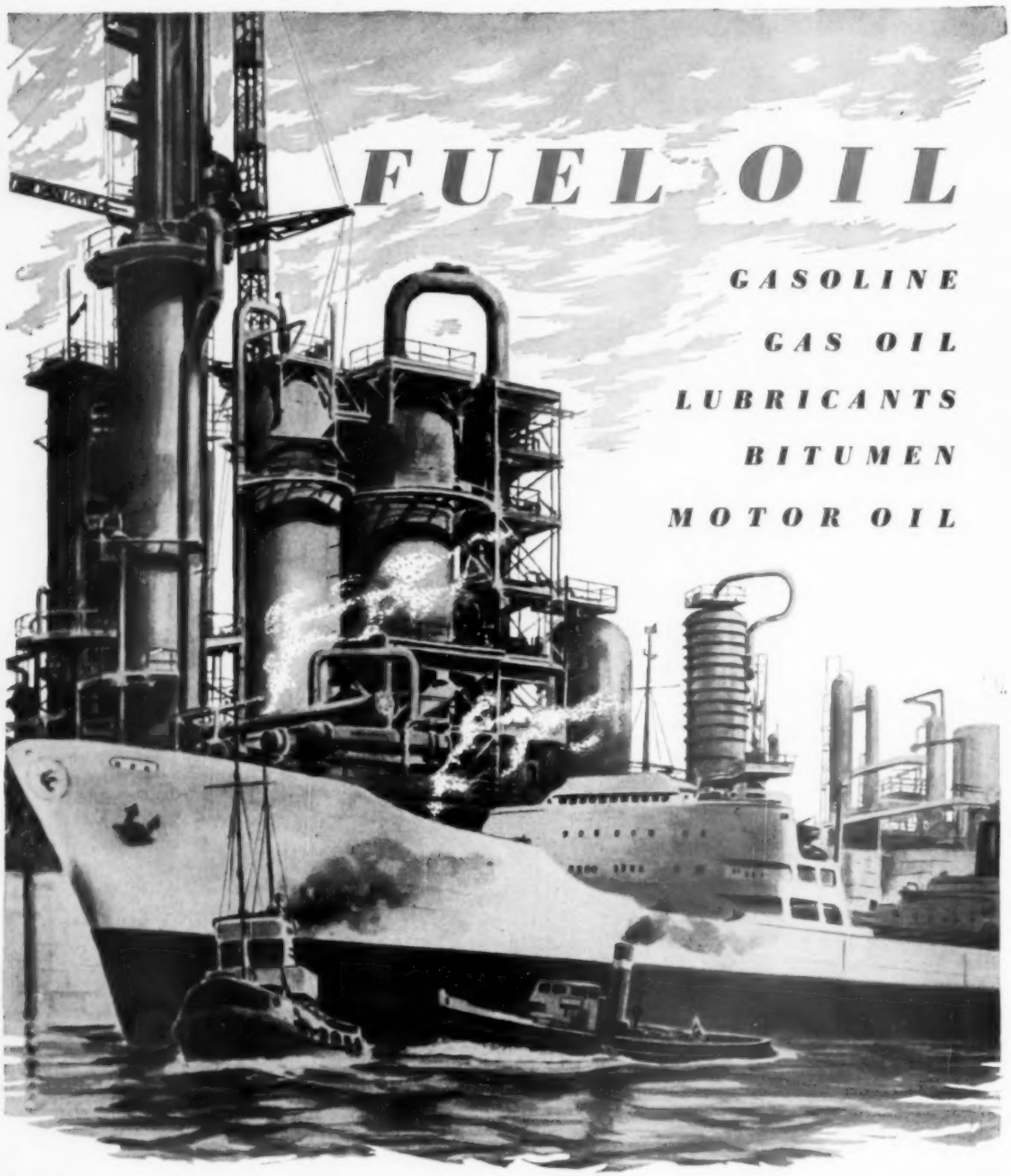

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best job for the least money is a standard, welded-steel stock tank being used as a combination surge and "meter" proving tank.

Under this arrangement, only the lower portion of the vessel is used as a surge tank for daily production and custody transfer. The upper half, internally cleaned and coated with an epoxy resin, remains clean, and is used only once each month, or as often as required to "prove" the P.D. meter and establish an acceptable "meter factor."

At present, two additional 100-bbl. stock tanks are installed, but these will be removed once the metering system has proved itself sufficiently accurate and dependable to satisfy the pipeline company, and manual gauging is no longer required.

Another unusual feature is the fact that there are no conventional "start" and "stop" float-operated switches installed in the surge tank.

The entire transfer cycle is initiated by a preset program timer, which can be made to start as many cycles per 24-hour period as are required to satisfy daily production demands. A run an hour is possible.

A third unusual feature is a beacon light affixed to a pole extending above the surge tank. It is visible from the pumper's house ¼ mi. away and serves several purposes.

The beacon is activated by the timer switch at the same time a ten-minute recirculation period is commenced at the start of each transfer cycle. If the light does not flash, the pumper knows the system is inoperative through electrical failure, or otherwise.

The beacon, which is set to switch off automatically at the end of each recirculation period, is again activated by the BS&W monitor if bad oil is detected. The monitor opens a bypass valve and recirculates oil to the surge tank if BS&W content exceeds 0.3% for more than one minute. The pumper, alerted by the beacon, can run the bad oil back through the heater manually until BS&W content meets pipeline specs.

If the operator fails to answer the beacon, oil continues into the surge tank until cleaned, or the high-level shutdown switch is reached. In the latter event, all wells on the lease are shut down automatically.

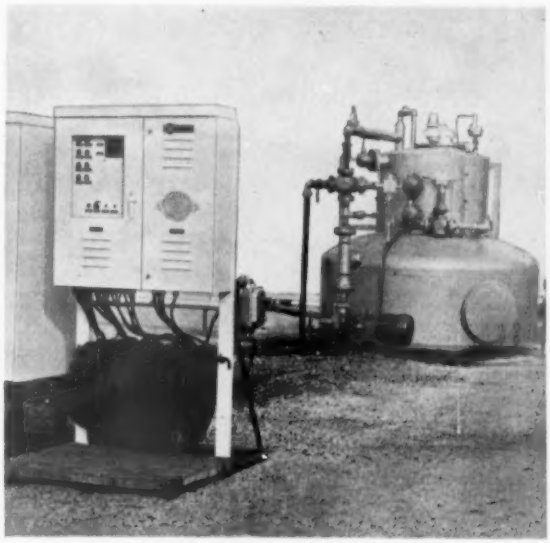
The transfer cycle for the Sinclair-designed LACT unit, although not unique, may be considered unusual by virtue of its simplicity.

The program timer, preset to come on at arbitrary intervals, opens a hydromotor bypass valve and starts the pump taking crude from the surge tank. Oil is circulated through the BS&W monitor probe and temperature-sensing cell for 10 or 15 minutes, allowing the temperature compensating device to become adjusted to the oil temperature and register the crude at a corrected temperature of 60F.

The timer then closes the bypass valve, increasing pressure to 30 psi, and opening the back pressure regulator, which permits crude to pass through the P.D. meter for delivery into the pipeline.

The pump, once activated, continues to take merchantable crude (as determined by the BS&W monitor) until the liquid level in the surge tank is lowered sufficiently to cause the low-pressure shutdown switch to terminate the cycle.

A Canadian engineer—noting the rapid rise in use of oilfield automation—warns that in the rush to meet this swiftly-expanding market, equipment manufacturers may be overstressing "packaged deals."



ALL-ELECTRIC CONTROLS operate Murdock Tank & Mfg. Co. skid-mounted ACT unit for handling 3 b/d to 500 b/d of oil.

W. R. Scrimes, Imperial Oil Ltd. electrical engineer, told the Fifth World Petroleum Congress that there has been a tendency of such equipment suppliers to anticipate prematurely the demand for the new equipment available.

"To obtain an advantage over their competitors," he said, "they have put together various forms of 'packaged deals' to promote their own products rather than to provide a sound engineering service to the industry."

He added that up to now "user-designed" installations are the most common, due almost entirely to the fact that it is still too early to establish standardization. Until such time, he said, manufacturers can utilize resources better by developing superior components, rather than expending efforts on poorly-conceived, inadequate systems.

Other Developments Help, Too

A lease-size unit to help solve the problem of dehydrating and sweetening gas selectively where the flow volume is too slight for installation of a large capacity gas-treating plant is under development.

Maloney-Crawford Tank & Mfg. Co. currently is making minor revisions on the Selective Absorption Unit conceived by Stanley A. Moussa, of Dallas, prior to offering it for sale on a commercial basis.

The unit is mounted on two skids—one carrying two towers and the other a heater and pump. The towers are packed with Linde Co. molecular sieves, Type 5-A. While one tower is removing water and hydrogen sulfide from the gas stream, the other is regenerating. Hot oil pumped from the heater is circulated through coils imbedded in the tower to heat it up. When regeneration is completed, the tower is cooled and the gas flow switched to it.

The key to the operation is the fact that the unit dries the gas and removes the hydrogen sulfide without removing carbon dioxide from the gas stream. This cuts down on

continued ▸

WATER-LANDING HELICOPTER by Vertol Aircraft will help operators haul crews and equipment to inaccessible areas.

the expense of building the unit (pipelines will accept gas containing some carbon dioxide).

Strong efforts are being continued to overcome the old problem of fouling and sediment deposits. Some gains are being made; others are in the offing.

In the Mid-Continent, recent innovations in treating equipment and techniques have made solvent removal of basic sediment and water, sludge, and paraffin from lease tanks more effective, helping to trim production costs.

Early this year, Para-Lax Corp., of Tulsa, put into use a circulating unit dubbed the "Lease Work Horse." Its main working parts consists of a French-patented Moyno screw-type pump, an 18-hp., 2-cycle gasoline engine with a sealed electric system, and a manifold through which solvent can be introduced by vacuum.

The amount of BS&W buildup and the sand and water content in the tank are measured, and the proper blending proportions of solvent and fresh oil are determined.

A circulating hose is run from the "Lease Work Horse" to the tank, and solvent is circulated, usually 3 to 5 gal., for from 45 minutes to an hour. Attached to the hose is a 1-in. pipe forming an "arm" to extend from the gauge hatch to the bottom of the tank.

Either a "tee rake" or a "jet rake," operated by hydraulic action, is used to agitate the tank bottom and hasten the solvent action, as well as to scrape the bottom of the harder-to-clean tanks.

If the tank bottoms contain considerable water and sand, the oil is circulated through a heater-treater. Usable bottoms in the form of paraffin are dissolved and again become part of the oil.

Para-Lax says a crew can handle up to four 500-bbl. lease tanks per day, with its smaller version of the unit taking care of 15-20 bbl. per hour of basic sediment.

One brand new production wrinkle is a radiation device—a continuous-flow density measurement system—to gauge the sand concentration in well fracturing jobs.

Industrial Nucleonics Corp., of Columbus, Ohio, has developed the AccuRay Density Measurement System, which, it feels, will have a wide variety of applications within the oil industry.

Basically, it involves the emission of gamma rays from a source, through the material to be measured, to a detector. (The source, for example, can be on one side of a pipe and the detector on the other to measure the density of material flowing through the pipe.)

The amount of radiation absorbed by the detector depends on the mass of the intercepting material.

The detector's pickup of radiation is reflected in a flowing electrical current, which is proportional to the amount of radiation received. This current is amplified and presented on a meter and/or recorder in proper units of measurement. These electrical signals provide a basic measure of density, percentage of solids, specific gravity, or other similar values.

Industrial Nucleonics recently sold one of the systems to Producers Chemical Co., Borger, Tex., for use in well fracturing.

This system is aimed at providing a continous, accurate measurement of the sand concentration in any type of fracturing fluid during the entire period of the frac job. The measurements are recorded on a permanent strip log.

The device is designed to assist in achieving a continuous, balanced ratio of sand to fracturing fluid.

Instead of mixing the sand with the oil through some type of auger or screw device, Industrial Nucleonics says, the sand can be dumped directly into a hopper with the oil and still be measured accurately for the proper sand-oil ratio.

And, because the Accu Blend system provides instantaneous gauging, corrective action can be taken immediately to control proper balance between the sand and oil, the company adds.

Industrial Nucleonics says the radiation source is hermetically sealed, and secured in a shielded and locked housing with access only to authorized personnel—and, further, that the radiation is too slight to contaminate fluids.

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Reprints of this report are being prepared and will be available in July. Single copies will be sent to Petroleum Week subscribers on request without charge. Additional copies will be billed at the following rates: 1-10 copies, 50¢ each; 11-100, 40¢ each; 101-1,000, 30¢ each; over 1,000, 20¢ each. Address orders to:

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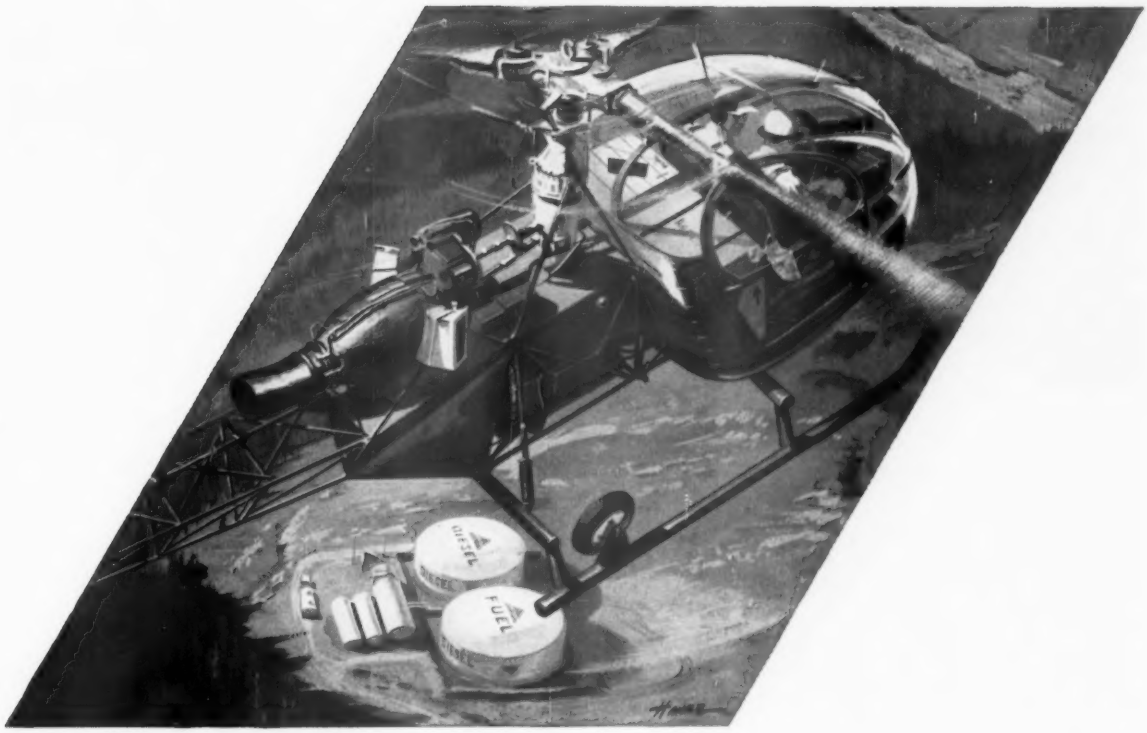

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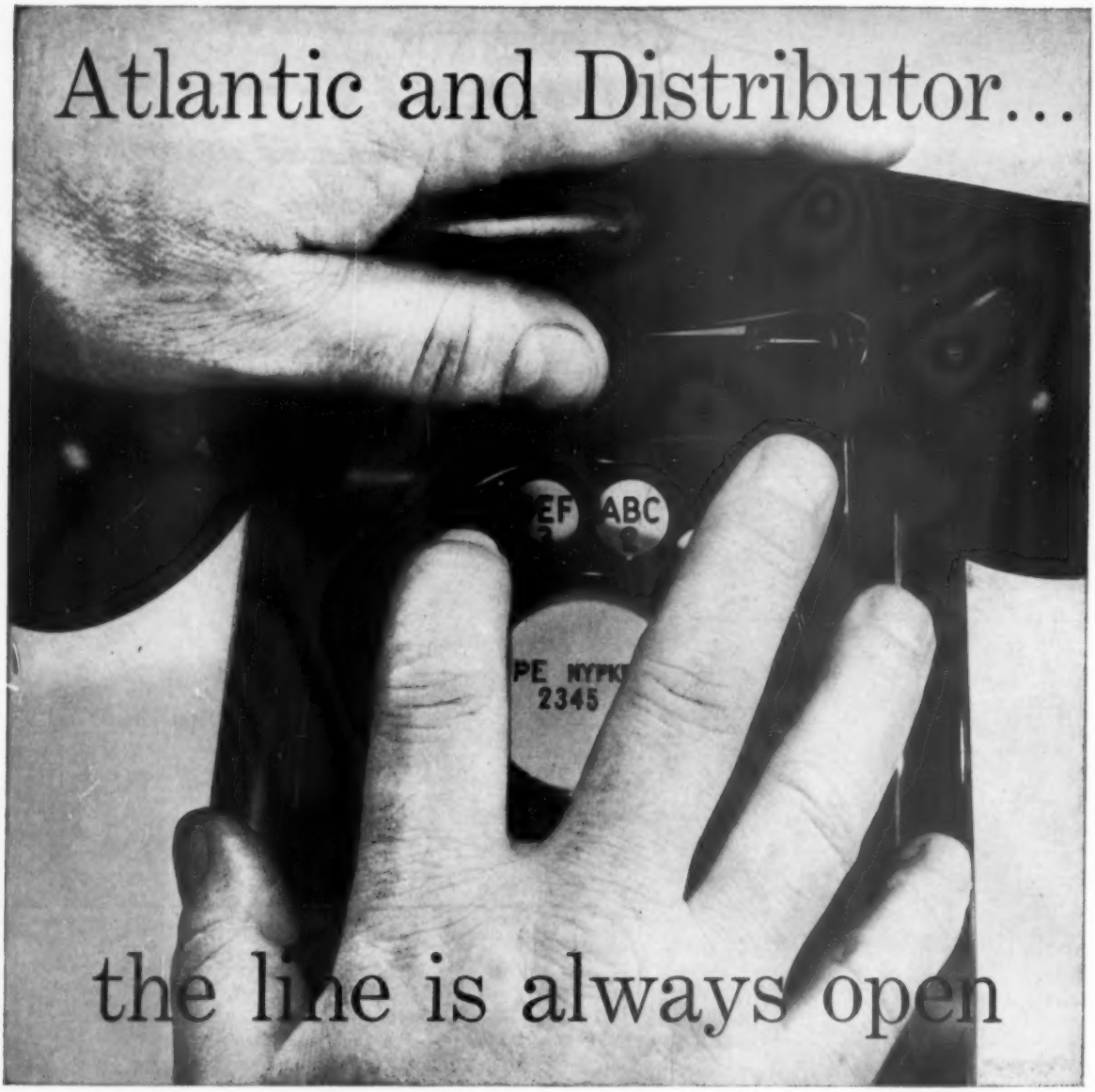

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The Atlantic Refining Company

Cure in Sight for Boiler Corrosion?

There's no panacea yet to prevent fouling and corrosion of boilers and gas turbines fired with residual fuel oil. But gratifying progress is being reported.

The serious problem of corrosion of steam boilers and gas turbines that are fired with residual fuel oils is being vigorously attacked from several angles, in Europe as well as in the U.S., and appears to be getting closer to solution. This was reported to the 5th World Petroleum Congress by experts from both sides of the ocean.

Residual fuel always contains some sulfur, as well as various metals such as sodium and vanadium—some in its ash, some in solution. Vanadium content may be as high as 500 parts per million in fuel oils made from South American or Middle Eastern crudes.

When this fuel oil is burned, certain oxygenated combinations of these products are formed, which are highly objectionable on three counts:

(1) They form deposits, difficult and sometimes impossible to remove, on boiler and superheater tubes, in economizers and air preheaters, and on gas turbine blades.

(2) They attack the metallic elements with which they come in contact, in the "hot portion" of the flame and gas travel.

(3) They become liquid, condensed acids, and corrode the metallic elements in the "cool portion" of the gas travel.

It is neither economical, nor technically feasible, to remove from the fuel oil, before its utilization, objectionable elements such as sulfur, sodium, or vanadium.

It has therefore been necessary to study the mechanism of the behavior of these elements during combustion and along the paths of the gases, and to find out experimentally how the trouble they cause can be prevented.

Without the use of some additive, deposits and corrosion apparently cannot be economically avoided.

This is the conclusion of extensive experimental work conducted by engineers from British Petroleum Co. in England; from Escher Wyss A.G., Brown Boveri & Co., and Sulzer Bros., Ltd., in Switzerland; and from Esso Research & Engineering Co. and Public Service Electric & Gas Co. (N. J.) in the U.S.

Corrosion-resistant steels have been tried, but do not work out too well if the metal temperature in the hot portion of the flame and gas travel exceeds 1,150F.

High-nickel steels will not stand up under that sort of high-temperature corrosion. High-chromium steels, with 11% of nickel and around 19% of chromium, seem to be the most resistant.

Corrosion of the "cool portion" of the system—that is, the economizer, the air preheater, and the stack—occurs when the flue gas temperature falls below the dew point, about 400F.

Thus, one way of avoiding corrosion in the cool portion of an oil-fired installation would appear to be by maintaining the flue gases at high temperatures. This, however, is inefficient; an effort toward lower temperatures is the general rule.

Incomplete combustion, leaving a percentage of carbon monoxide in the gases, also tends to reduce corrosion. But this also is a wasteful method, which operators are reluctant to follow.

For the past few years, various additives, in liquid, gaseous, or solid form, have been tried in an effort to avoid deposit fouling and corrosion. So far, no single additive will perform simultaneously the threefold task assigned to it: high- and low-temperature corrosion inhibition, and fouling prevention.

Many additives that seemed promising have caused more trouble than they cured.

For instance, liquid additives, generally byproducts of coal tar distillation, have been injected into the "cool portion" of an installation. There they coat the metal surfaces, and prevent corrosion to a certain degree. But they become very corrosive when the sections on which they are applied are being washed. For that reason they are not currently used.

Ammonia injection has been tried commercially in Great Britain and in France, and appears to reduce corrosion of the "cool portions." But unless it is introduced at exactly the right points and exactly the right temperatures, a sticky deposit of ash and ammonium bisulphate tends to develop, which plugs the gas passages. "This can be remedied," says G. Whittingham, of British Petroleum, "by the use of a secondary additive—such as magnesium oxide—injected in very small concentrations into the combustion chamber."

By far the best results in general reduction of deposits and of corrosion throughout an installation seem to have been obtained by injection of magnesium salts with the fuel oil, at the burner.

The application of magnesium compounds started with the use of powdered dolomite, which is a magnesium and calcium carbonate. Promising results led to investigation of other magnesium salts, such as magnesium oxide, hydroxide, carbonate, silicate (talc), sulphate, and naphthenate. These were introduced into the path of the gases either as an oil slurry or in powdered form.

"We use a specially-developed feeder to inject a magnesium oxide slurry into our fuel oil just at the burner, at Marcus Hook," says W. S. Shippani of Sinclair Refining Co., one of the pioneers in this field, "and have had excellent results."

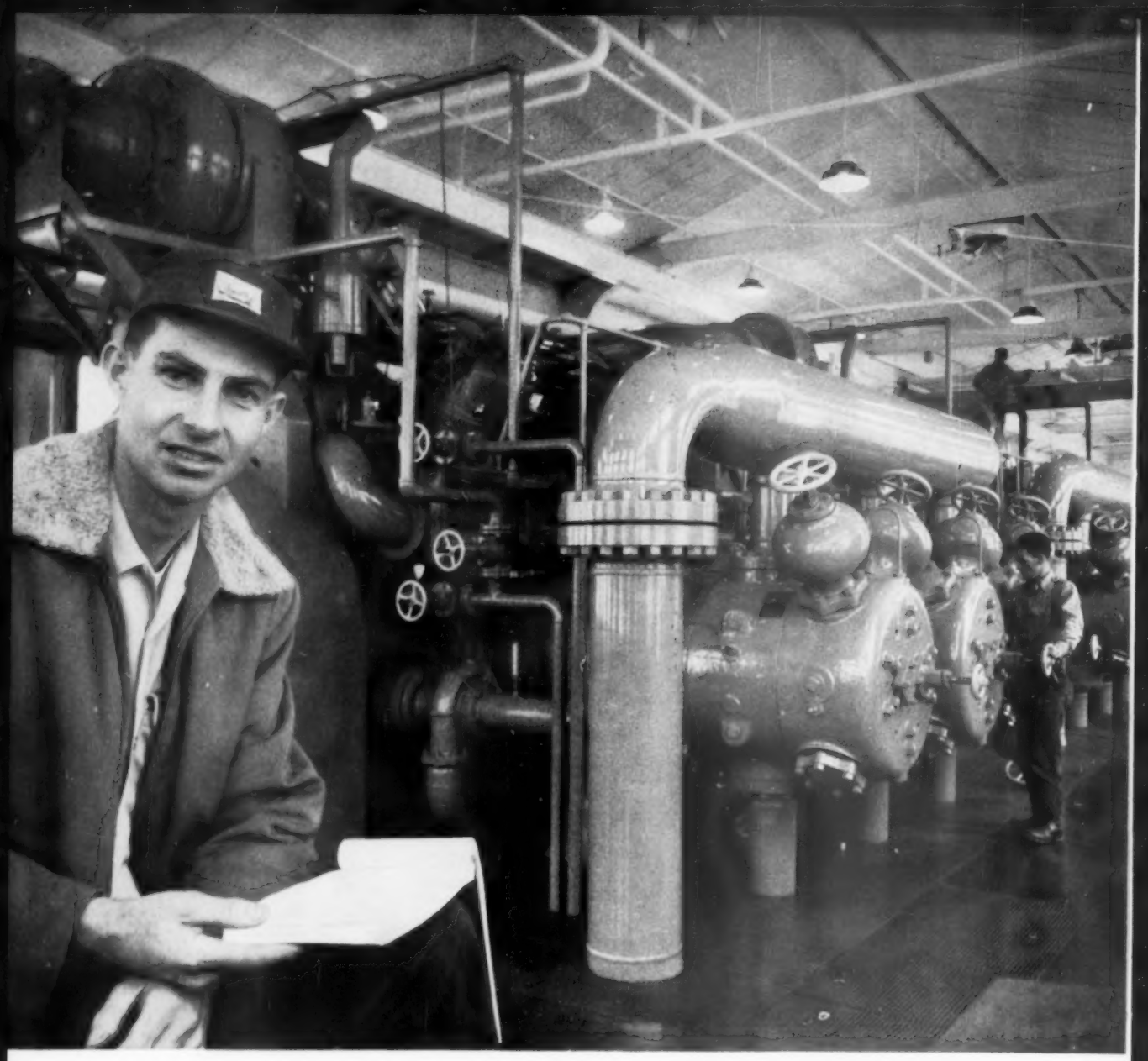
"We use magnesium hydroxide, at the rate of 2 parts of magnesium in the additive to 1 part of vanadium in the fuel oil," reports R. A. Baker, of Public Service (N. J.). "It is introduced steadily in powdered form at the burner, with gratifying results. We have burned residual fuels containing as much as 500 ppm. of vanadium."

"At gas temperatures of 1,250F, magnesium sulphate additive can be employed, necessitating simply a periodic washing of the turbine with water," say the Sulzer gas turbine engineers. "For higher temperatures, however, there is no additive which allows, to our knowledge, industrial operation with commercially available residual oils. Fuels with little or no ash must be used."

The Escher-Wyss engineers report that they have added 1% of finely ground dolomite to the fuel and that alloy-steel preheater tubes show no traces of deposits or corrosion after 1,000 hours at up to 1,400F.

Aluminum salts, introduced in oil-soluble form into the fuel, have also proven effective—but expensive.

More development seems necessary if corrosion is to be avoided with metal temperatures much in excess of those indicated.



Exterior view of Utica Station.

The three compact 6-cylinder Cooper-Bessemer GMVC Compressors are rated 1000 hp at 300 rpm. Two have been in service since 1957. One was added in 1959.

Victor G. Fulkerson, *Head Engineer, Utica Station, New York State Natural Gas Corporation, explains...*

How the new Utica Station meets growing demands with Cooper-Bessemer Compressors

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"Averaging about 85 million cubic feet per 24 hours, the station has pumped peak loads of as much as 140 million cubic feet. Entering the station at 400-700 psi, the gas is discharged at 600-900 psi."

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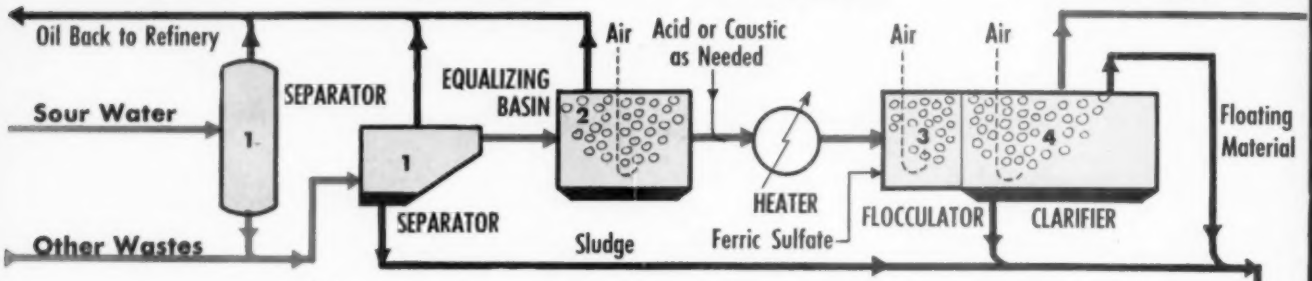


How Cities Service Makes Pure Water from

A waste treatment plant, called by its operators the most modern, complete, and effective in the world, was inaugurated recently when Cities Service Oil Co. started its 20,000 b/d Trafalgar refinery at Bronte, Ontario.

The Trafalgar plant treats a great variety of wastes, from refinery process water to sanitary waste and equipment leakage. And the resultant, treated, water, is so pure and so clear that it is used in an aquarium open to the public for inspection.

The average quantity of waste treated is 300 gallons per minute, but this may vary considerably over a 24-hour period.

The process used for the purification, especially for the removal of phenols and of the last traces of entrained oil, is a biological process, based on the action of bacteria upon certain chemicals.

Here is how it works (flow chart): After most of the oil in the waste has been removed by decantation in oil separators and equalizer basins (1) and (2), a check is made, and the waste is neutralized by addition of acid or caustic, as the case may be.

It is then preheated to 95F, which has been found to be the temperature most favorable to the treatment.

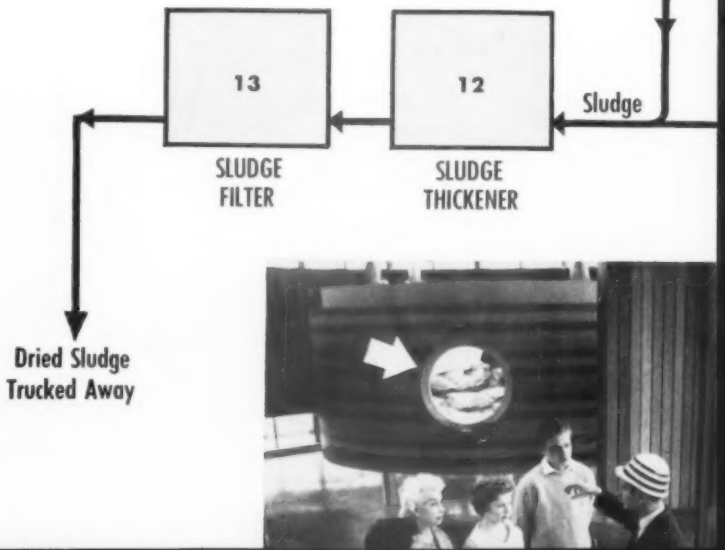
It goes to a flocculation tank (3) where it is thoroughly mixed with a ferric sulfate solution. This chemical breaks down the oil-in-water emulsion, and causes what is left of the oil to form heavy particles, called floc. The flocculation tank is separated by a perforated wooden partition from a clarifier basin (4), in which that floc is either precipitated or skimmed off.

The heavy sludge from the separators and from the clarifier is carried away for further treatment.

When it leaves the clarifier basin, the waste water has thus been relieved of most of its suspended solids, but it still contains its objectionable chemicals, in solution or fine emulsion. Before it enters the actual treatment plant, phosphorus and nitrogen, which are ingredients necessary to the life of the bacteria, are introduced into it.

In the treatment plant, the waste remains, in two consecutive aeration tanks (5), under the influence of air and of the very bacteria which it carries. These bacteria are voracious: they eat up most of the noxious chemicals, particularly the phenols, and convert them into simple, harmless, compounds. Once this is done, the waste trickles through piles of honeycomb plastic elements, referred to as "Dow-Pac filters" (6), which retain most of the suspended compounds just formed. A further segregation from sludge is obtained in a second clarifier.

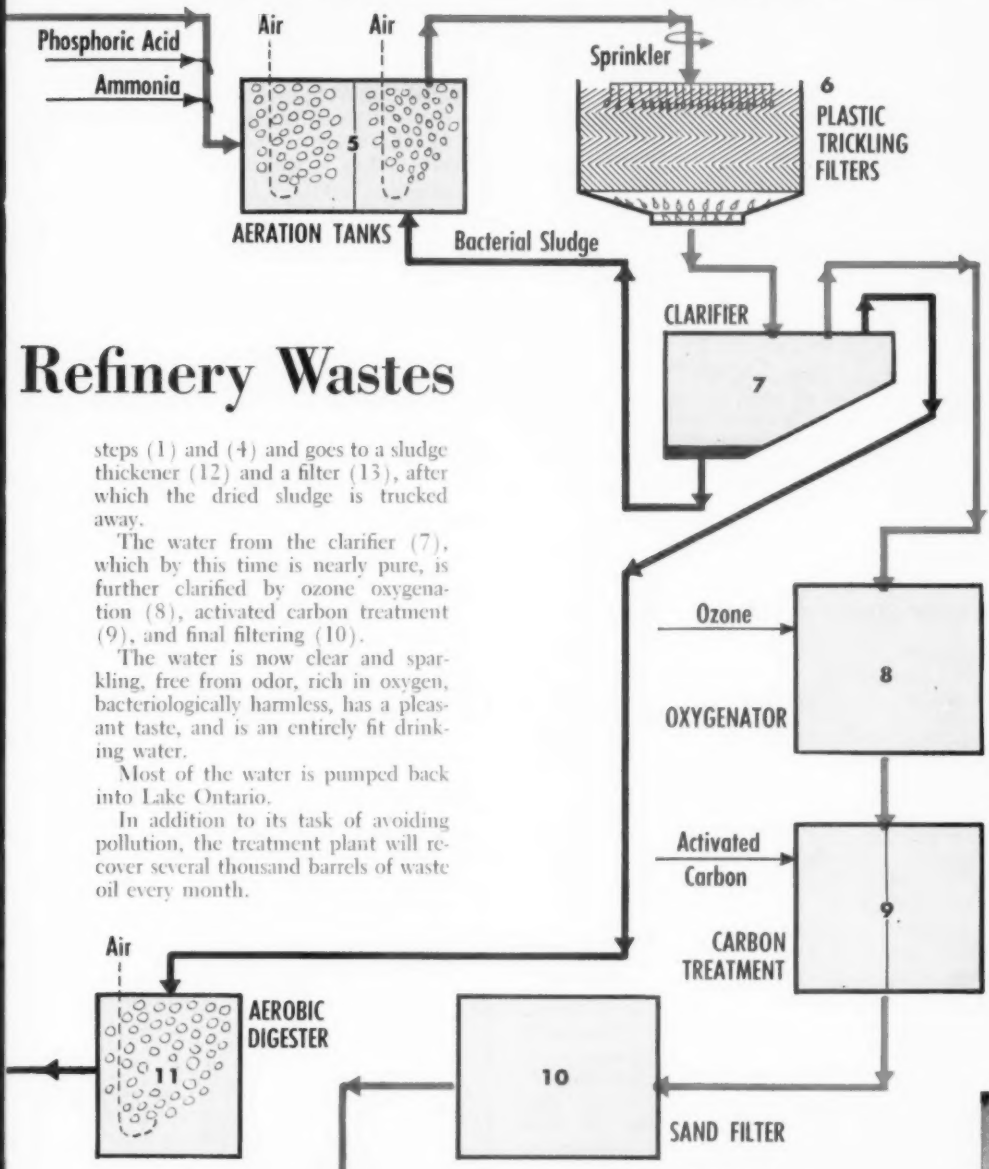
The bacterial sludge removed from this clarifier follows one of two routes. Some of it is diverted back into the aeration tanks (5) in order to maintain the bacterial population at its prescribed level, to sustain the biological process. The rest of it goes to an aerobic digester (11) where the bacteria are destroyed by simple "starvation." Then it joins the sludge from



5. Aeration Tanks

6. Trickling Filters

7. Clarifier



Refinery Wastes

steps (1) and (4) and goes to a sludge thickener (12) and a filter (13), after which the dried sludge is trucked away.

The water from the clarifier (7), which by this time is nearly pure, is further clarified by ozone oxygenation (8), activated carbon treatment (9), and final filtering (10).

The water is now clear and sparkling, free from odor, rich in oxygen, bacteriologically harmless, has a pleasant taste, and is an entirely fit drinking water.

Most of the water is pumped back into Lake Ontario.

In addition to its task of avoiding pollution, the treatment plant will recover several thousand barrels of waste oil every month.

8. Ozone Oxygenation

9. Carbon Treatment

10. Final Filtering

FINALLY, the water is pure enough to drink — or to use in an aquarium (arrow).

What's New / IN PROCESSING AND PETROCHEMICALS

Petroleos Mexicanos has announced plans to step-up the quality of its refinery products and petroleum based chemicals.

The company will construct two new platforming units and three unifining units designed by Universal Oil Products Co. In addition, a new UOP Udex unit for benzene, toluene, and xylene manufacture, and a Hydrar unit for cyclohexane production will also be installed.

Design and construction of the new units will begin immediately, with detailed engineering handled by the Fluor Corp.

•

New processes for making tetraethyl lead, the principal anti-knock additive for gasoline, were disclosed recently at the Fifth World Petroleum Congress.

In a lecture entitled "Organometallic Compounds in Petrochemistry," Dr. Karl Ziegler, director of the Max Planck Institute at Mulheim-Ruhr, West Germany, said that the new processes show many advantages over those currently used. Four instead of six steps are now required; reactions take place at lower temperatures—212F instead of 1,112F; and less electrical power is needed to give a 100% product yield.

At the same time, Ethyl Corp. revealed additional findings from their studies in tetraethyl lead manufacturing. One of these would cut in half the amount of sodium metal and chlorine previously consumed.

•

New facilities for the manufacture of oil additives are now in operation at Olin Mathieson Chemical Corp.'s plant near Brandenburg, Ky.

The additives, to be marketed under the trade name OMAVIS, raise the viscosity index and depress the pour point of multi-graded motor oils, automatic transmission fluids, and conventional oils.

•

Skelly Oil Co. and Sinclair Oil & Gas Co. will construct a gas products plant and field gathering system to process oil well gas production in the Maljamar and Loco Hills fields in Eddy County, N. M.

The plant will have a compressor capacity designed to gather and compress 12-million cu. ft. of gas daily, and will include equipment capable of processing 20-million cf/d.

An estimated 48,000 gal. of products will be recovered daily consisting of natural gasoline, butane, and propane. Construction will begin shortly with completion scheduled for April, 1960.

•

A 10-million lb.-per-year polypropylene film plant will be built near New Castle, Del., by AviSun Corp., an equally owned subsidiary of Sun Oil Co. and American Viscose Corp. AviSun was formed earlier this year to manufacture, process, and market polypropylene resins, film and fibers. Completion of the new unit is slated for early fall of this year.

•

Tennessee Gas Transmission Co. has taken option to purchase 792 acres along the highly industrialized Houston Ship Channel. It is reported that the company plans to construct processing facilities on the tract. TGT already owns a 50% interest in Petro-Tex Chemical Corp., located on the ship channel, and a gas plant at nearby La Porte, Tex.

•

Tears Engineers, of Dallas, and Iino Shipbuilding & Engineering Co., Ltd., of Japan, have signed a technical assistance agreement to design and construct two chemical process plants in Japan.

A $6-million gas synthesis production plant will be built for Nitto Chemical Industry Co., Ltd.

The two companies will also design the acetylene and ethylene production section of a $20-million project at Ube for Kyowa Fermentation Industry Co., Ltd.

New: Low-Temperature Isomerization

A new process for upgrading virgin naphthas to high-octane gasoline components—at low temperature, and at a cost substantially below that of conventional methods—has now been made available by Esso Research & Engineering Co. Extensive pilot plant trials have been conducted at Esso's Baton Rouge (La.) laboratory.

The process is an isomerization, but it differs from the other methods used for conversion of low-octane straight-chain paraffins into branched or cyclic paraffins in several respects.

For example, the catalytic reforming method described as far back as the proceedings of the Fourth World Petroleum Congress, in 1955 in Rome, is also an isomerization process, but it requires a temperature of 700F to 900F; the aluminum chloride slush isomerization process operates best within a range from 200F to 250F.

The new Esso process, on the other hand, makes it possible to operate in the liquid phase at temperatures as low as 80F to 120F.

In addition, the charge goes through the reactor once only, without the need for recycling, and gives almost 100% conversion of the C_5 and C_6 components into such desirable isomers as isopentane, 2,2- and 2,3-diethyl butane, and cyclic compounds.

The isomerate produced in the new process also has a very high motor octane rating, a very good sensitivity (difference between motor and research ratings) and excellent lead susceptibility.

Esso credits the success of the process to a new, extremely active catalyst.

The cost should be between 5¢ and 10¢ per octane number increase per bbl. of gasoline, depending on the size of the plant and the nature of the feed stock, according to the Esso engineers.

This cost does not take into account any preliminary fractionation of the feedstock, but it includes the removal from that feedstock of certain impurities which would endanger the life of the catalyst.

The isomerate also promises to become a desirable component for aviation gasoline.

another
TRETOLITE SERVICE
report

STOP LOSING OIL DOLLARS!

start treating with TRETOLITE chemicals

TRET-O-LITE* *Demulsifiers*

TRET-O-LITE Demulsifying Chemicals separate a water phase from an oil phase, or vice versa.

Separation procedure consists of injecting and dispersing a small proportion of the proper TRET-O-LITE Demulsifier with the emulsified fluids, then providing suitable storage where oil and water can separate. Because of the large number of problems encountered in treating petroleum emulsions, a large number of chemical demulsifiers have been developed.

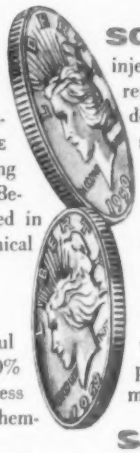
TRET-O-LITE* *Chemical Desalting*

TRET-O-LITE Chemical Desalting removes harmful salts from crude oils, and does so in the 95% to 100% efficiency range. It is currently being used to process over 1½ million barrels of crude daily at an average chemical cost of 1.3 mills per barrel.

The Tretolite Company offers a choice of installation plans: Tretolite desalting equipment may be purchased, rented, rented with option to purchase, or constructed by the refiner according to Tretolite design and specifications.

KONTOL* *Corrosion Inhibitors*

These liquid organic semi-polar compounds are available in various formulas, which adsorb on metal surfaces to form an impervious film that inhibits corrosion. This film protects the equipment from corrosive elements in either brine, crude oil, gas or combinations of these. The strength of the bond between the protecting KONTOL film and the metal surface is demonstrated by the fact that protection continues for a substantial period after treatment is stopped.



SOLVO* *Paraffin Removers*

SOLVO can be injected into oil wells, pipelines, or storage facilities to remove and prevent the accumulation of paraffin. Such deposits often cause sucker rods to stick, requiring shutdown for removal. They also clog lead lines to the point where fluid throughput is seriously reduced. Paraffin settlings rob storage tanks of valuable capacity. SOLVO is useful in removing and preventing such accumulations.

FLUDEX* *Water Flood Additives*

FLUDEX is applicable to the stimulation of injectivity in water flood and water disposal systems. It acts also to prevent corrosion and scale deposition, and to assist in maintaining and restoring the permeability of formations.

S. P. *Scale Preventives*

S. P. Scale Preventives are used in producing wells to prevent the deposition of calcium hardness scales. They prevent damage caused by deposition of scale in oil well tubing, sucker rods, well casing, flow lines, heaters and water-disposal or water-flood systems.

TOLAD† *Fuel Additives*

TOLAD Fuel Additives are ashless, totally oil-soluble compounds designed to enhance the stability of domestic heating oils and diesel fuels, as expressed in color and residue. These additives have excellent water tolerance characteristics in reducing sludge formation and loss to water bottoms in fuel storage. They are available in inhibitor or inhibitor-dispersant formulas.

*TRET-O-LITE, KONTOL, SOLVO and FLUDEX are registered trademarks of Petrolite Corporation.

†TOLAD is a Petrolite Corporation trademark, registration pending.

AP-59-1

PETROLITE CORPORATION

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NETHERLANDS: F. E. C. Jenkins, Hoefbladlaan 134, The Hague
PERU: International Gas Lift Company, Apartado 71, Talara
TRINIDAD: Neal and Massy, Ltd., P.O. Box 544, Port of Spain

THIS TEMPORARY CAMP will be replaced by a bigger unit now under construction, as part of the "buildup program."

France Making Hassi Messaoud a Showcase

(This is one of a series of on-the-spot reports by a member of PETROLEUM WEEK'S *Paris Bureau)*

FRENCH SAHARA—The U.S. oil man, who thinks mainly in terms of finding oil and getting it to market, might wonder why France is turning a major oil field into a showplace. But he'll understand why if he considers a few French facts.

France imports some 90% of its oil needs, mostly from the Middle East, and pays a heavy price in scarce foreign exchange. Despite sporadic exploration around the French Union, no one really believed France would ever be a major oil-producing nation.

Then Esso discovered the Parentis field in southwestern France in 1954. And everyone—from government officials and bankers to the man in the street—became oil conscious (PW—Apr.11'58,p14). Parentis set a precedent as a tourist attraction, with an oil museum, guided tours, and an excursion boat to offshore wells. And then the discovery of far-greater oil reserves in the French Sahara brought France's oil fever to a still higher pitch.

Hassi Messaoud has now become a symbol of oil independence from outside sources for France, and maybe even for its European neighbors.

Then, too, a little simple arithmetic shows that over half of the field's reserves belong to the French government.

Hassi Messaoud is jointly owned by SN Repal (Soc. Nationale de Recherches et d'Exploitation des Petroles en Algerie) and CFPA (Cie. Francaise des Petroles Algerie). The government has an 81% controlling interest in SN Repal. And CFPA is owned 85% by Cie. Francaise des Petroles, France's only international oil operator, which, in turn, is owned 35% by the government.

The government took the risk, hit the jackpot, and now feels it must show taxpayers and legislators that the money was well spent.

A good deal of the money spent on discovery and early development of Hassi Messaoud came from government coffers—in the years before 1956, when private investors shied away from oil exploration.

Armand Colot, SN Repal's executive vice-president, who runs the show from the company's main office in Algiers, puts it this way: "We're a government company, which means we have obligations to the public that a private company doesn't have.

"We have lots of other responsibilities. As a state-controlled enterprise, we have to be more open for inspection, and more concerned with conservation and social development than a purely private outfit. At the same time, we have to push our exploration program faster than anyone else."

Finally, there's the war in Algeria, directly north of the Sahara. Armed guards posted at each Hassi Messaoud rig are a grim reminder.

The government's determination to keep Algeria in the French Community has been bolstered by the oil and gas discoveries in the Sahara. Officials are now working on a plan to industrialize Algeria with the help of Sahara resources, and eventually to raise the population's living standards.

The government likes to take influential visitors to the Sahara to show them what's at stake.

Not all of the 1,000 to 3,000 French and foreign government officials, politicians, diplomats, and businessmen who visit Hassi Messaoud each month get the red-carpet treatment. Some only drop in for a quick

FREE-FLOWING WINE helps brighten life in the African desert.

AND FRENCH COOKING gets a boost from regularly delivered fresh food.

For a Reason

look around as part of a guided tour from Paris to Algiers to an oasis.

But whether he's taken around in a bus for a two-hour rubberneck tour, or comfortably installed in the plush 3-room apartment built to house General Charles de Gaulle on his recent trip, the visitor gets a warm welcome.

As his station wagon speeds over brand-new asphalt roads, the visitor can see the bustle of construction everywhere.

Going up at record speed are a modern camp with all the comforts of home, and all the industrial installations needed by a major oilfield operation: hundreds of miles of roads and paths, an airport, a water distribution system, a power station, a production center, and 180 mi. of gathering lines leading to the nearly finished 24-in. pipeline to the Mediterranean.

Visitors aren't the only ones who get handled with kid gloves. Working conditions are favorable enough to bring a steady stream of job applicants into the SN Repal offices.

The men are comfortably lodged, two to an air-conditioned cabin. All fixing-up is done by turbaned cabin boys from the nearby Quargla oasis. Food is up to the usual high French standards, and the wine flows freely.

The day is split into three eight-hour shifts. Each man works one week on each shift, with no weekends. Then he is flown to Algiers for a week's leave. Most of the married men have their families in Algiers. The bachelors presumably head for the night spots.

If the government's plans work out, a full-fledged oil community will spring up at Hassi Messaoud—including houses, schools, and hospitals.

Jacques Soustelle, Cabinet minister with authority over the Sahara, announced recently that a town would be built so the men could be joined by their families.

He didn't say, however, who would foot the bill.

The married men are enthusiastic about the idea. But the bachelors are noticeably cooler. As one remarked, "What a prospect. I can just see wash hanging on clotheslines, beauty parlors, and kids underfoot. I came here to get away from all that."

In Venezuela:

Oil Layoffs Spur Public Works

(By cable from PETROLEUM WEEK'S *Caracas Bureau)*

CARACAS—The government is speeding up its study of a public works program for outlying towns to provide temporary relief from unemployment due to oil industry layoffs.

The program would set up new housing and public services in an effort to remodel the squalid communities that have sprung up near oil towns.

Labor Minister Luis Hernandez Solis and a commission from other government agencies and oil worker unions left Caracas recently to study the situation in El Tigre, in Eastern Venezuela, hardest hit by layoffs.

The move followed a meeting of President Romulo Betancourt with oil company officials to consider means of easing unemployment.

Venezuela's Labor Minister estimates the net reduction in oil industry personnel over the past year at upwards of 5,000, out of a total industry payroll of around 45,000. He says unemployment is not alarming, but that it is a cause for some concern.

Out of the 5,000, he says, 3,500 were laid off in 1958, and the remainder this year.

The bulk of layoffs are by contractors and service companies rather than operating companies (PW—June 12'59,p51).

One of the most recent cutbacks was by Flint Construction Co. of South America, which laid off its entire work force of 110 men in El Tigre. Labor unions say 800 men have been laid off in El Tigre in the past three months.

India Enters Oil Marketing

BOMBAY—India is setting up a $25.5-million state-owned oil marketing company. Initially, it will distribute oil products for government needs alone.

The government reportedly accounts for 10% to 15% of total Indian demand, which now stands at about 122,000 b/d.

The new company will handle products primarily from two new government refineries being set up at Gauhati (Assam) and Barauni (Bihar).

The 15,000 b/d Gauhati unit is slated to go on stream in 1961, while the 40,000 b/d Barauni plant is slated to begin producing a year later.

If any product shortages occur in India, the government plans to import from communist countries against rupee accounts.

The government reportedly prefers not to import oil products, but will take whatever steps are necessary to insure adequate supplies. Shortages of kerosine and lube oils are considered likely within the next five years.

Both Prime Minister Nehru and the Minister of Mines & Oils have said the unit will operate in cooperation with existing marketing companies, operated by Burmah Shell, Stanvac, and Caltex.

But with New Delhi now firmly established in all branches of the oil industry, governmental effort to control company operations is believed almost certain to increase (PW—Mar.20'59,p74).

What's New / AROUND THE WORLD

SPAIN—The government's INI has picked its preferential rights granted under Spain's new 50-50 oil law (PW—Jan.16'59,p66). And the government has O.K.'d exploration regulations implementing the law.

INI had first choice on 8,650,000-acres in mainland Spain, and picked acreage in ten different areas, including the province of Burgos, where Valdebro (a private company) has just reported an "encouraging" oil show. Other areas are: Santander, Victoria, Tafalla, Navarra, Saragossa, Vich, East Teruel, East Cuenca, Jerez, and East Cadiz.

The weekend of July 11 now looks like the date for filing of applications for land in mainland Spain, Spanish Guinea, and the Spanish Sahara. The government then has 30 working days to study bids.

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AUSTRIA—Italy's ENI is entering Austria's highly competitive oil market. A subsidiary, AGIP AG., Austria, has been set up in Vienna, capitalized at $38,500. AGIP is slated to establish its own retail outlets in southern Austria supplied from Italian refineries, and to draw on "other refineries" for products, for the northern, eastern, and western parts of the country.

•

INDIA—Another wildcat in the Cambay area reportedly has had a show of oil at 5,000 ft. The Sokhola wildcat is near Lunej, where India's Oil & Natural Gas Commission claimed to have found oil last year (PW—Dec.5'58,p60).

•

MEXICO—Workers in the nationalized oil industry are demanding a 20% boost in wages plus fringe benefits, totaling an estimated $20-million. A strike has been set for July 31, last day of the existing contract, if no agreement is reached. During last fall's strike, troops and riot squads were used (PW—Sep.5'58,p50).

•

DENMARK—Six Western oil companies have agreed, under government pressure, to handle increased government imports of Soviet fuel oil. However, a new Danish company, backed by consumer and agricultural cooperatives, may take over the imports. They are reported willing to invest in oil storage because of their interest in promoting Danish farm exports to the Soviets.

Under a new two-year trade pact, 8% to 10% of Danish fuel oil import needs will be covered by Soviet deliveries. These will be stepped up from about 70,000 tons a year to about 250,000 tons.

•

IVORY COAST—Plymouth Oil Co. is bringing in a heavier rig to resume drilling in its wildcat here. The test, a few miles east of Abidjan, was suspended at 10,350 ft. but is slated to reach 13,000 ft. A 51% interest in the venture is held by a French government-controlled firm, and 10% by M. L. Benedum, and Benedum-Trees Oil Co.

•

PERU—Texaco has stopped drilling and exploration activities here. The company said it found no commercial oil, and is now giving up 3-million acres of its 5-million Sechura Desert concession.

•

BORNEO — Japan's government-controlled Teikoku Oil Co. may explore the Miri and Seria areas of Borneo outside the Shell fields. A geologist and drilling engineer have already been sent to the area, where the Japanese drilled some wells in 1917.

•

ARGENTINA—Bolivia has started shipping 2,520 b/d of crude to Argentina as payment for Argentine construction of the Yacuiba railroad.

The shipments mark the inauguration of the first 360 mi. stretch of the Argentine oil monopoly's Campo Duran pipeline, which will eventually run 923 mi. to YPF's San Lorenzo refinery (PW—Jun.12'59,p48).

•

HUNGARY—The government is planning to expand refining capacity with two new 20,000 b/d units. One, slated for completion in 1961, is now under constructon near an existing unit at Szoeny. The second is planned 18 mi. south of Budapest at Szazhalombatta, western-most end of the southern prong of the projected Soviet-Satellite pipeline (PW—Apr.10'59, p31). In addition, Hungary's 1960 crude output goal of 22,000 b/d is now to be reached this year.

•

ARGENTINA—Loeb, Rhoades will invest $5-million in railroad equipment to facilitate transport of its crude output in the Mendoza area to the San Lorenzo refinery. The group was also recently awarded a $38-million contract to build a 680-mi., 12¾-in. products line from Mendoza to Buenos Aires.

•

PARAGUAY—Pure Oil Co. hit a thin string of gas sand in its No. 1 Mendoza at 1,937 ft., in the northwest corner of the Chaco region. The company is now drilling ahead toward scheduled depth of 10,000 ft.

•

ISRAEL — Oil demand climbed about 10% in 1958 to total 30,000 b/d. Gasoline demand rose 5%, diesel oil 16%, and kerosine, cooking gas, and fuel oil about 10% each.

•

UNITED KINGDOM—Orders for British oil equipment and associated materials topped $81-million during the first quarter of this year, according to the Council of British Manufacturers of Petroleum Equipment. About two-thirds of the orders are for use overseas.

Fierce Competition Puts Oil Firm in Red

WEST GERMANY—How sharp market competition is cutting oil refining and marketing profits in West Germany is illustrated in Esso AG's annual report for 1958. Esso reported a $4.6-million deficit in net earnings in 1958, compared with a $2-million profit in 1957, due to price competition, particularly in the fuel oil field. This is despite the fact that the company boosted sales roughly 10% to $452.4-million. Esso's capital investments in refining and marketing reached $48-million last year, double the 1957 total.

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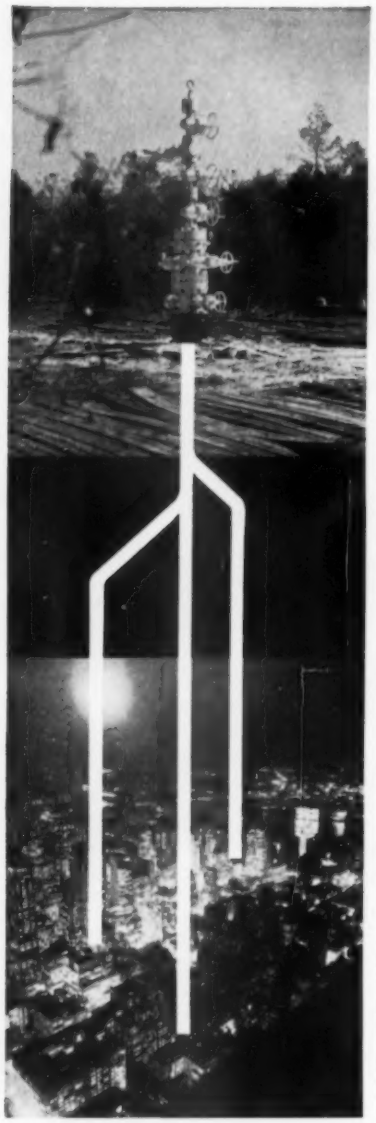


Carrying Texas and Louisiana natural gas to the markets where the most people are

TRANSCONTINENTAL GAS PIPE LINE CORPORATION

SIX-IN-ONE: The pipelaying machine of the future (above), inspired by a conception of S. W. Kinsolving, is one of four startling developments he sees for the field.

Nonstop Pipelaying?

An era in which pipelaying would be revolutionized—by a machine of fantastic design and by radically new methods—is envisioned by S. W. Kinsolving, president of Sun Pipe Line Co., division of Sun Oil Co., Philadelphia.

The machine and methods, are still "pipe dreams." Just when—or if—they might become realities, no one knows. Groundwork for the transformation, however, is already being laid. And in various ways: deep-water laying of pipelines; the stringing of flexible pipe by helicopter; pulverization of a right of way by huge earth-mover-manglers.

These developments comprise the basic stuff of which Kinsolving's vision of even greater strides is made.

He visualizes a single machine that would perform every operation from the manufacture to the laying of pipe; transoceanic lines; and the aerial laying of pipelines.

Here is a more detailed description of the prophecies, given to PETROLEUM WEEK by Kinsolving:

- A gigantic, vehicular, tree-mangling, ditch-digging, pipe-extruding, back-filling machine, which would lay a pipeline in the roughest terrain in one nonstop operation.
- Underseas lines linking continents (if and when the economic demand for them ever arose).
- A helicopter carrying a giant spool of flexible pipe, which would string out over the earth as fast as the whirlbird moved. This would probably be used primarily in emergency situations, such as a threat of war.

Kinsolving explains that many of the things he foresees have already started to take shape.

During World War II's "Operation Pluto," four flexible products lines were laid under the English Channel to supply the Normandy beachhead with fuel. The years since then have seen the production of flexible, "armored" cable of up to 4 in. in diameter, which can be coiled in a ship's hold for deep-water laying.

"This could be mounted beneath a helicopter and laid for the transportation of gasoline, oil, and other products under pressure of up to 1,000 lb per sq. in.," says Kinsolving.

What he has done is to apply the principle of running out a line from a spool to aerial transportation; with a view toward a possible saving of time, if a situation ever occurred in which the method were found practical.

The possibility of a transoceanic pipeline is certainly not far-fetched in light of the work that already has been done in this direction, he feels.

"I've been talking to people who say they can lay a pipeline in 10,000 ft. of water, pulling it 150 mi.," Kinsolving says. (He is referring to Samuel Collins, of Samuel Collins Construction Co., Victoria, Tex.) "A transoceanic pipeline is not beyond

Braniff International Airways
has selected STEWART & STEVENSON
self-propelled diesel electric units for dependable ground support

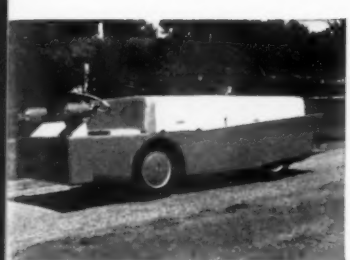
Something new and revolutionary in commercial airline transportation will be appearing very soon at airports throughout the Nation. Luxurious new jet liners will be shortening flight time for Braniff, and other airline passengers.

Ground support units for the A.C. electrical power source on these jet liners will be the new Stewart & Stevenson Airport Utility Units.

These Self-Propelled Diesel Powered Units by Stewart & Stevenson provide a totally new concept in ground support electrical generator sets. They combine a very low silhouette for extreme maneuverability with economy, dependability, and top performance.

Similarly designed and powered Stewart & Stevenson Diesel Electric Units have been in use for several years in our Nation's missile, radar and rocket programs.

For the right answer to any power problem . . . for any industry . . . look to Stewart & Stevenson.



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THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES

An OFFSHORE first

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wells under

PUSH BUTTON CONTROL

Eliminates ALL operators on platform

SIE solid state electronic control systems provide remote well head and flow station control. Complete well test programming, data logging, alarms and continual data scan give you *every* necessary control function for an ***entire*** well complex — at the push of an SIE button!

Only specialists in control devoted to the Oil Industry

Write Rex Grey for your personal copy of . . .

"Control . . . the answer to increased pipe line profits"

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SIE

the realm of possibility. Certain developments lead to the logical conclusion that such things could take place."

With today's import controls and low tanker transportation costs, there is no need for such a line. But who knows what might happen later? Kinsolving's is an "if and when" story.

The four-in-one machine is "not so foolish as it might sound," he says.

He sees it as growing out of today's huge earth-moving equipment, such as the Mangler, built by R. G. LeTourneau, Inc., Longview, Tex., which fells trees of up to 8 in. in diameter and "chews them up like it was mowing your lawn."

Kinsolving has added three more parts—big, complex ones, to be sure—to consolidate the entire process, from pipe manufacture to back-filling, in one theoretically streamlined operation. "Probably very feasible," he says.

The motive behind Kinsolving's look into the future is an economic one—to try to save money through revolutionary machines and methods.

He admits that he has no hard figures either as to how much money might be saved if his still-novel ideas could be put into practice, or as to how long it may take before they are. But he adds, "I think they are developments which can take place."

Flexible Barge Gets Deep-Sea O.K.

The first deep-sea trial of a flexible barge has indicated that such shipments are "entirely practical," according to Imperial Chemical Industries, of London, which conducted the tests earlier this month.

Imperial filled a sausage-shaped nylon-rubber container with unidentified liquid hydrocarbons at its Billingham (England) plant, and then towed the barge 260 nautical miles to Flushing, Holland.

An ocean-going tug pulled the container at an average speed of 6.8 knots.

Dracone Developments, Ltd., maker of the container, says the test indicates that "most of the problems [of deep-sea operation] are licked now."

A Dracone representative described the recent voyage this way:

"The North Sea provided plenty of short, steep seas, up to 9 ft. high, which threw the tug around rather a lot. But they didn't seem to worry the Dracone, which sidled over and through the wave crests with a minimum of fuss."

The flexible barge is already in use for harbor shipments of oil products.

Earlier this year (PW—Mar.13'59,p 62), Esso Petroleum Co., Ltd., began using a Dracone between Fawley, England, and the Isle of Wight.

Canada Builds Its Largest Ship—A Tanker

This is the largest ship ever built in Canada—the 40,000-ton tanker "Federal Monarch," which will be launched June 19 at the yard of Davie Shipbuilding, Ltd., Lauzon, Quebec. After completion later this year, the vessel will be chartered to Imperial Oil Ltd. for service from Venezuela to Portland, Me., and Halifax, Nova Scotia. The ship has a crude cargo capacity of 357,000 bbl.

IF YOU ARE A PIPELINER

. . . you'll appreciate the time and labor saving features found only in UNIBOLT Scraper Trap and Blowdown Closures, particularly the long-life, self-sealing gasket.
For complete details, please write:

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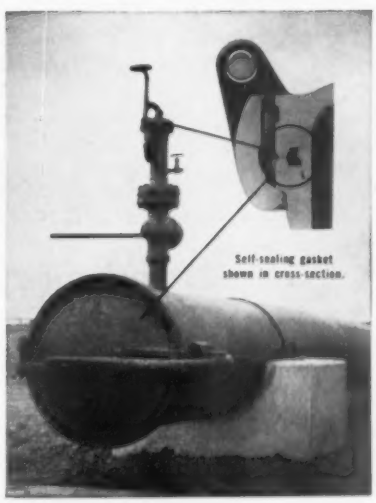

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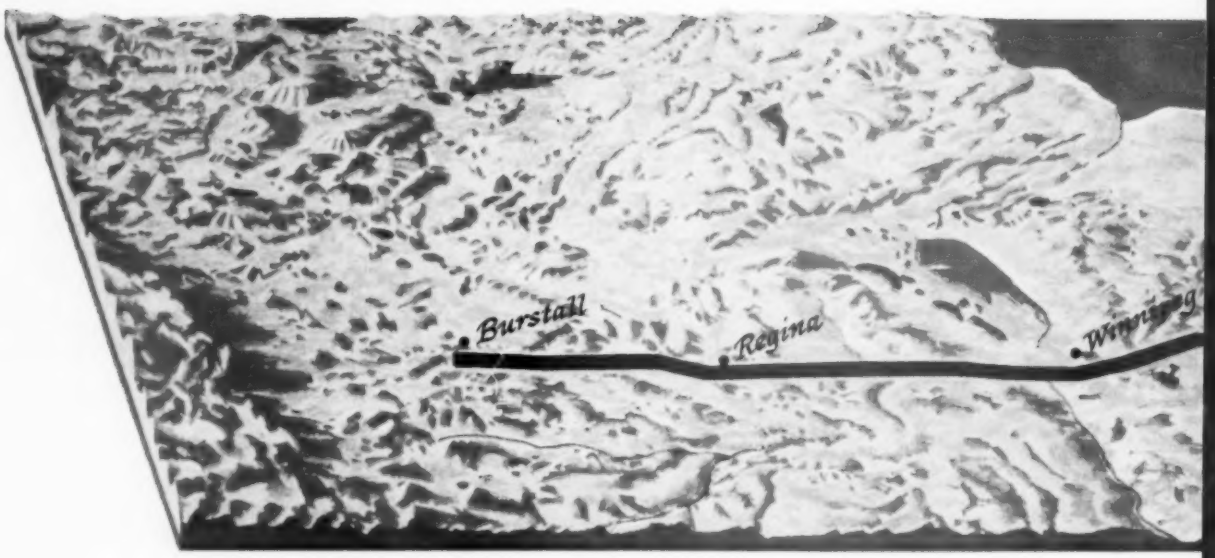


Trans-Canada Pipe Lines completed ahead of schedule despite shifting sands, diamond-hard rock, white water and tricky muskeg

This immense project began in 1954 when 76 miles of 20-inch pipe was laid from Niagara to Toronto. Since then — construction has proceeded ahead of schedule and within estimated costs. Today, Alberta natural gas, rather than gas from American sources, can be delivered at rates of 620 million cu. ft. a day through the main 30- and 34-in. line.

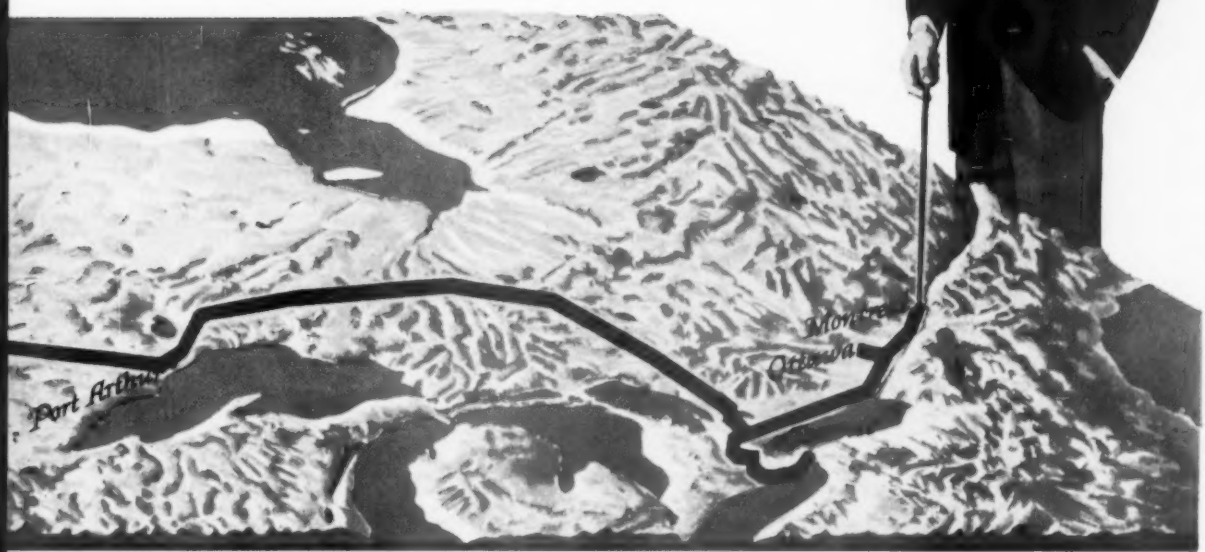
The line spans turbulent rivers, the Great Sand Hills, hard rock and spongy muskeg. Frequently, the work progressed despite temperatures to 48° below zero.

A. O. Smith was one of the major suppliers of pipe for this 2290-mile line which is now delivering natural gas to homes and industries along its route — an area containing three-fifths of Canada's population.

For over 30 years . . .

A. O. Smith line pipe has always been manufactured to a high standard of quality . . . precisely controlled at every step of production. That's why A. O. Smith pipe, made and installed in 1928, is still in operation. That's why so much A. O. Smith pipe is in nearly every important high-pressure line.

90 → miles!



Spanning 2290 miles, the Trans-Canada line reaches from the Province of Alberta to Montreal . . . and proposed additions will extend the line as far east as Quebec.

Typical of nature's efforts to thwart completion of the line were temperatures ranging to 48° below zero. Nevertheless, work progressed ahead of schedule and below estimated costs.

The formidable Laurentian Shield was blasted, ripped, drilled and shattered to make way for Canada's longest natural gas pipeline. Going was rough, but the rewards for Canadians were far greater.

Through research A.O. Smith *. . . a better way*

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Heavy-Duty Pipe Cutters

Factory tested for perfect tracking, here's your best cutter buy for hand use. Extra-long shank protects threads, gives fast, easy adjustment. Large handle for sure grip . . . more leverage. Strong, special malleable frame won't bend or warp. You'll also need the RIDGID Wide-Roll Cutter, that tracks perfectly at high power-drive speeds, and the RIDGID 4-Wheel Cutters, that give quick, clean cuts in tight places with only quarter turns.

Five Sizes for ⅛" to 6"

For Tubing and Thin-Wall Conduit buy

RIDGID

Tubing Cutters

Five Sizes for ⅛" to 4"

Exclusive fold-in reamer on Nos. 10, 15 and 20 protects hands and pockets . . . reams full cutter capacity. Thin-blade wheel gives quick, clean cuts. Rollers smooth tubing ready for soldering. Special RIDGID No. 315 3-Wheel Cutter gives fast cuts in hard-to-get-at places.

There's a RIDGID Cutter to save you time on every job. Call your Supply House today!

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THE LIBERTY NATIONAL BANK & TRUST CO. OKLAHOMA CITY

The right background for competent service. Ask for Morrison Tucker Grady Harris Paul McGuire Jim Berry

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All day long, it's RUSH—RUSH—RUSH!

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This variable-speed reading technique, pioneered by Petroleum Week, was designed for busy men like you—to give you the industry-wide oil information you want and need, in the shortest possible time.

What's New / IN TRANSPORTATION AND STORAGE

Monterey Oil Co. has formed Monterey Pipeline Co., a wholly owned subsidiary, to supply intrastate natural gas for Louisiana industry.

The new company will supply gas for the Mississippi River industrial complex between New Orleans and Baton Rouge. Construction will begin this month on a 37½-mi. pipeline, from the Darrow Dome-Lake Boeuf area to the Sugar Bowl Pipeline system at Waverly Junction, near Thibodaux. The 85-mi. Sugar Bowl line will carry the Monterey gas to market.

The Monterey system is expected to be ready this September.

•

The trend toward connection of airfields—commercial and military—to their sources of fuel supply by pipeline is picking up speed.

Southern Pacific Pipeline Co. now plans to build a 15-mi. spur from its system to Vincent Air Force Base at Yuma, Ariz. The line should be in service by mid-August.

And Potomac Public Service Co. plans to lay pipelines to three airfields in the Washington (D. C.) area. Potomac's $15-million project will connect Washington National Airport, the new Chantilly Field, and Andrews Air Force Base with centrally located storage facilities.

Fuel will be brought to the Washington-area storage site by rail tank cars.

•

The Federal Power Commission will hold hearings next week on Michigan Wisconsin Pipe Line Co.'s expansion plan to take 40-million additional cu. ft. of gas daily from Harper County, Okla.

Michigan Wisconsin wants to build 353 mi. of 24-in. mainline loops; 20.9 mi. of 16-in. loops; and an additional 22,380 compressor horsepower.

The expansion would cost about $37.5-million.

•

Another project to store natural gas in an abandoned gas field is planned for California.

Pacific Gas & Electric Co. has just asked the state public utilities commission for permission to operate a 32-well storage facility on McDonald Island, in the San Joaquin River delta.

The wells, 21 of which are yet to be drilled, will have a combined storage capacity of 30-billion cu. ft. of gas.

•

A mathematician and a physicist say that they've developed a formula for "the most efficient routing of gasoline tank trucks."

G. B. Danzig, of Rand Corp., Santa Monica, Calif., and J. H. Ramser, supervising physicist for Atlantic Refining Co., say their formula can give near optimum use of gasoline tank trucks.

Calculations for the formula can be performed by hand or by digital computer.

NEW
RED DOG
PACKING
For use in
Polish Rod Stuffing Boxes
and Slush Pumps
Reported 3-5 TIMES
LONGER SERVICE LIFE
PATENT No.
2,706,655
Check These Advantages!
Superior leak-proof sealing
Seals without excessive tightening of stuffing box nut
Unique design provides a definite space for lubrication and cooling
Resists abrasion
Longer life
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All standard sizes available
Made of specially compounded synthetic rubber, which is tough yet resilient, "Red Dog" packings resist abrasion. Distinctive shape provides a tighter seal for leak-proof sealing even in extremely severe environments.
A sample set of Red Dog packing is available on request . . . send us your stuffing box and rod size.
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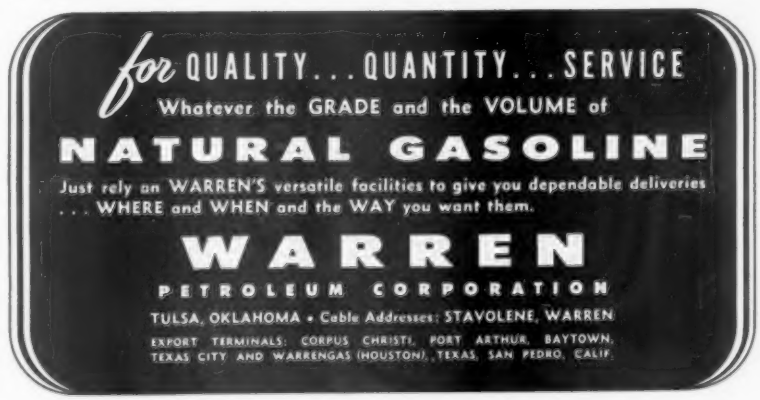
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Whatever the GRADE and the VOLUME of
NATURAL GASOLINE
Just rely on WARREN'S versatile facilities to give you dependable deliveries . . . WHERE and WHEN and the WAY you want them.
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Cab Drivers Try Diesels to Save Fuel

This is the year of the small car. But it is also the year of another new automotive development: diesel taxicabs.

Suddenly, diesel cabs are driving up to hack stations and pulling away with more and more of the profits. The trend is unmistakable:

- Checker Cab of Detroit (no relation to Checker Motors Corp.) has put ten diesel cabs on the road since last December. The company expects to be 100% diesel within three years.
- Many other cabmen in Detroit have told PETROLEUM WEEK that they foresee 100% diesel cab fleets in the near future.
- In California, Yellow Cab Co. is driving four diesels in San Francisco and four in Los Angeles.
- Ken Brown, of Ken Brown Inc. (sole installer of the Perkins Diesel engine in Plymouth cabs), says "The whole thing is snowballing." Brown predicts that 1,000 to 3,000 Perkins engines will be installed in 1960 Plymouth cabs.
- Cerlist Diesel, Inc., of Burlington, N. C., is testing a diesel that it has installed in a cab made by Checker Motors Corp., Kalamazoo, Mich. Cerlist says that it is going after big fleets, especially in New York City.
- Yellow Cab Co. of Philadelphia may buy about six diesel cabs for experimental use.

The big push to diesels is caused by rising operating costs of conventional cabs. Diesels promise extensive savings in fuel and maintenance.

Generally, diesel fuel is cheaper than gasoline (although in Detroit a gasoline price war has been keeping the two fuels about equal in price). And diesels consume less fuel than gasoline engines. Average mileage with a diesel is about 19 mi. per gal., compared to 10 or 11 mi. per gal. for gasoline.

As for maintenance, Checker Cab in Detroit expects to be able to run its diesels for 75,000 mi. before they need a ring job. In Europe (all cabs are diesel in Dusseldorf, Frankfort, and Berne, for example) diesels are being run from 100,000 to 150,000 mi. between overhauls.

The higher initial cost of diesels, their noisier operation, and their somewhat tougher shifting are drawbacks.

A Plymouth taxicab equipped with a Perkins Diesel engine costs about from $750 to $800 more than conventional Plymouth cabs. But fuel savings alone run to as much as $400 a year.

As for handling on the road, drivers on both sides of the Atlantic say that extra skill is required to shift the diesels. And the diesel tends to be noisy when idling or traveling at low speeds. Drivers also say that the diesel cabs are not as "agile" as typical American gasoline cabs in getting through busy city traffic.

Oil companies that supply taxicabs with gasoline are not enthusiastic about the shift to diesel taxicabs.

Standard Oil Co. of California is "not cheering" over the switch to diesels on the West Coast, according to W. Lansing Rothschild, president of Yellow Cab in San Francisco. He says that California Standard tends to look upon diesels as a potential threat to the gasoline market, rather than as a potential boost for diesel fuel.

However, a spokesmen for California Standard told PETROLEUM WEEK last week that it is still too early to come to any conclusions about diesels cabs.

Flying-A Adds Subtlety to Octanes

Tidewater Oil Co. is mixing sex, subtlety, and refining in an advertising approach that is unusual in the oil business.

In its new campaign, Tidewater is trying to appeal to the male driver's desire for masculinity, female attentiveness, power (both in himself and in his gasoline), and social status.

Specifically, Tidewater is flagging down the "Man and Drive": an intense, ambitious type who obviously likes good-looking women (Miss Universe appeared in one ad), flashy cars, and premium gasoline.

The shift in advertising approach comes somewhat as a surprise: For over a year Tidewater has been an industry leader in octane-advertising (PW—May16'58,p62).

Tidewater's marketing vice-president, J. Ronald Getty, explains the shift this way: "We believe that gasoline advertising has been so overwrought with puffery and superlatives that believability and consumer interest have suffered."

Tidewater was therefore faced with a problem, says Getty: "Should we join the crowded ranks of oil companies using thunderous headlines and wide, sweeping product claims . . . or should some other route be devised?"

In effect, Tidewater's new campaign gives the company a chance to personify power in the "Man with Drive." Tidewater will continue to stress high octanes and its Delaware and Avon refineries. But now these technical aspects of refining will be garbed in "human interest."

Tidewater's campaign is based on fundamental beliefs about male psychology.

"We have abundant reason to believe that every man attaches a great deal of significance to his car," says Getty. "His car is an important outlet for his drives."

But women are still very important to men: "When we find something of greater interest to men, we'll use it!" Getty remarks.

Is there a hint of sex appeal in the

Tidewater campaign? "Yes," Getty admits. "But we attempt to handle it with restraint." Nevertheless, the little bit of spice that Tidewater has added to its advertising represents a big departure for an industry that is usually conservative even with its innuendos.

Tidewater has selected advertising media which suit the tone of the campaign.

For instance, it is the only gasoline advertiser to appear in Playboy magazine. And to attract the hotrod driver, Tidewater is advertising in Hot Rod magazine. Flying-A ads have also turned up in True and Esquire—magazines with a large male readership.

An interesting note: The "Man with Drive" in these magazines will be younger than the Man who appears in Life magazine—which caters more to the family trade.

Marketers Commence Summer Advertising

Now that the vacation season is here oil companies are out to induce the motorist to travel more by automobile.

Standard Oil Co. (Ind.) has recently launched a completely integrated campaign, unifying $1.5-million in advertising with a dealer training program designed "to make a travel expert of every dealer."

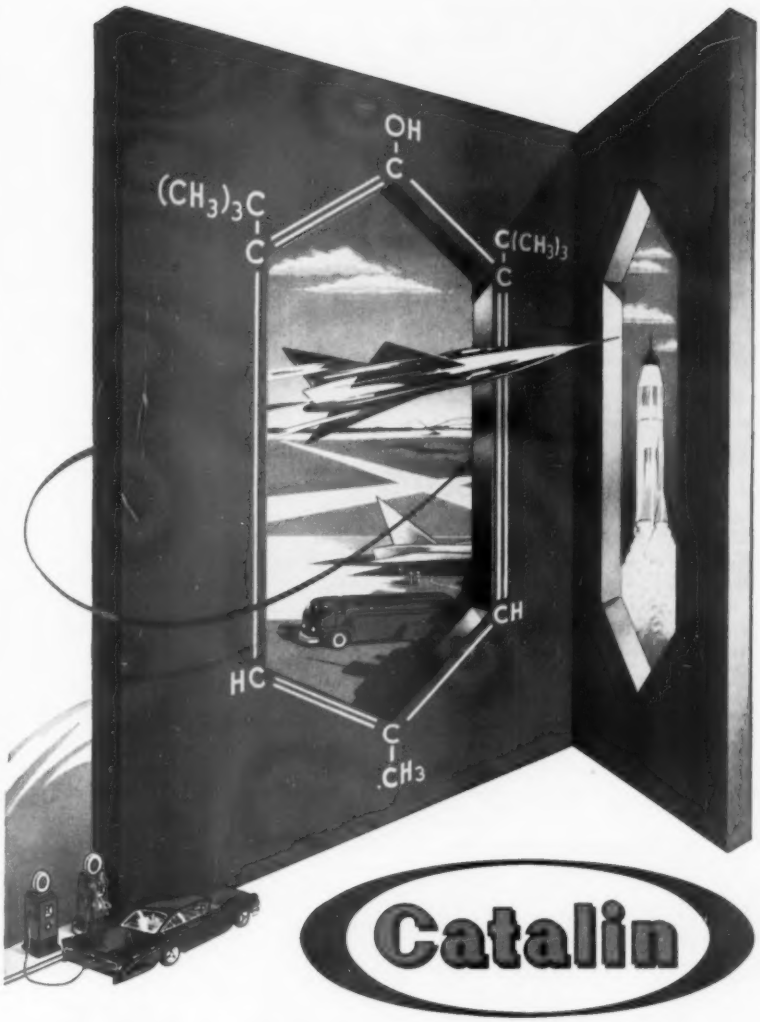
Continental Oil Co. has "streamlined" its Touraide Travel-guide, tempting the motorists with 64 pages devoted to the national parks, maps of Alaska and Canada, as well as travel information on the whole United States.

Texaco Inc., is slanting its travel campaign toward the history-minded motorists with a booklet on the origin of the American flag and historic points of interest in America.

Two factors make this summer season a particularly crucial one for gasoline marketers: oversupply and a taper-off in the use of automobiles for travel.

Gasoline stocks are excessively high (PW—Jun.12'59,p99) and there has been a decided downward trend in the number of miles that motorists drive their cars each year.

The American Petroleum Institute has already shown concern for this trend by organizing a special study group to find ways to stimulate gasoline demand. The group held its first orientation session in Des Moines last month.



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Catalin ANTIOXIDANT CAO-1...the field's finest grade of 2,6-ditertiary-butyl-para-cresol . . . meets U. S. Government military specifications for use in aviation gasolines, turbine and jet fuels. A major advantage achieved with this heat-resistant, water-insoluble antioxidant is that high-octane fuels are effectively protected, with no loss of octane rating. Gum and peroxide formations are inhibited, and deposits in the aircraft intake manifold and engine are markedly reduced.

Catalin ANTIOXIDANT CAO-1 stabilizes high-octane automotive gasolines, as well as turbine, insulating, hydraulic and transformer oils . . . in fact, nearly any petroleum hydrocarbon exposed to oxidizing conditions.

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chemicals / plastics / resins

*Typical Analysis

What's New / IN MARKETING

Exit: The Spare Tire

"Automotive trends point toward the elimination of the spare tire," said H. B. Hindin of the U.S. Rubber Co. this week.

Hindin told the Society of Automotive Engineers that the lower styling of today's cars and the shortage of trunk space—especially in small cars—make him "feel certain that the day of the spare tire is coming to an end."

But before the spare tire can be eliminated some satisfactory substitute must be found. Reason: flat tires are still a major cause of distress to motorists. According to Hindin, approximately 25% of all emergency road service calls placed with the American Automobile Association are caused by "tire difficulties."

•

Federal Trade Commission has charged 15 tire manufacturers and two trade associations with fixing prices in the sale of tires and tubes.

According to FTC, the top four tire manufacturers charged identical (or near identical) prices for tires and tubes to all customers of the same business standing, regardless of their geographical location and varying freight costs.

"Minor" manufacturers, says FTC, charged the same prices, less agreed-upon differentials.

The tire makers have thirty days to answer the charges.

•

Chairman James Roosevelt of the House Small Business Subcommittee is looking for information on distribution practices affecting small businesses within the oil industry.

He has sent questionnaires to petroleum industry suppliers and to organizations representing dealers, wholesalers, and jobbers. Roosevelt hopes to get information on price wars, alleged "price discrimination and coercion," competitive allowances that are "granted lessee-dealers during price wars, and alleged "artificial price situations.

Roosevelt asked that the questionnaires be returned by July 1.

•

For the first time, Standard Oil Co. (Ind.) is offering package burner service to its home heating oil customers throughout the Midwest.

The basic plan, carried out by service agents under Standard contract, provides for inspection, tune-up, cleaning, and emergency service for a specified annual cost, pro-rated into monthly payments.

Standard's package service represents another step by the oil industry toward offering more complete and economical heat in competition with gas heating.

•

Sales at gasoline service stations reflected the general upswing in gasoline demand by reaching a record $1,469-million last month.

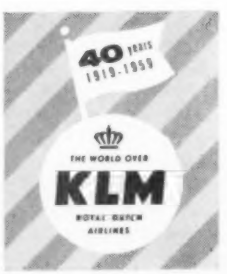
Sales in April 1959 were $1,348-million, and in May 1958 they were $1,335-million. Marketers are hopeful that this month will not show a repeat of the temporary decline that was incurred in June 1958, when sales dipped to $1,331-million.

DIRECT

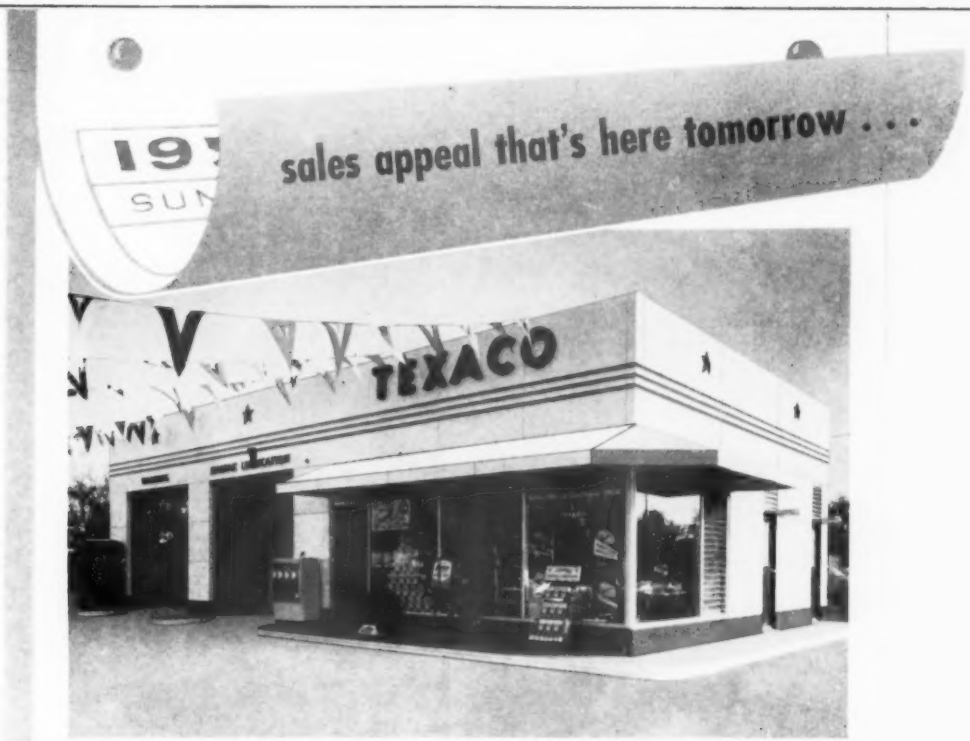
PIPELINE TO THE WORLD'S OIL CENTERS

CARGO OR PASSENGER, IT'S KLM "THE OILMAN'S AIRLINE!"

FROM HOUSTON: direct to Europe, Africa, the Near, Middle and Far East. FROM MIAMI: direct to South America. Daily service. FROM MONTREAL: direct to Europe, Africa, the Near, Middle and Far East. FROM NEW YORK: direct to all Europe and beyond; also to Curacao, Aruba and South America. IMPORTANT: Your cargo receives rapid ground handling. Awkward shapes easily accommodated. FOR PASSENGER SERVICE: Call your Travel Agent or KLM office. For cargo service: Contact your Cargo Agent, Forwarder or KLM office.



KLM ROYAL DUTCH AIRLINES • 430 PARK AVENUE • NEW YORK 22, N.Y.



Avoncraft

porcelain enamel service stations

Opening day, and for years to come—your Avoncraft stations look the same. Bright and colorful. Invitingly clean. Strictly modern. That's because Avoncraft's *sales appeal* is fused right into the porcelain finish *to last a lifetime!* And, while sales appeal is *way up*, maintenance costs go *down*—soap and water's all that's needed to keep Avoncraft stations gleaming. Forget about periodic repainting, structural repair and water-proofing — with Avoncraft they're never needed.

Write for our new full-color brochure, ***Function and Lasting Beauty***

"Package" designs to order . . .
In quantities from 1 to 50 or more . . .
All-steel construction . . .
Structure is porcelain inside and out . . .

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DEPT / Personals

H. D. McHENRY has been elected executive vice-president of Southern Natural Gas Co., Birmingham, Ala. He was most recently vice-president, secretary, and general counsel for the company. He joined Southern Natural in 1936 in New York, and moved to Birmingham in 1941.

H. D. McHenry

L. C. Hamlin

LAWRENCE C. HAMLIN has been appointed regional vice-president of Standard-Vacuum Oil Co., with responsibility for its Far East operations. He succeeds **J. V. Pickering,** a director, who is now responsible for Stanvac's marketing operations. Hamlin will coordinate all the company's interest in Japan, Korea, the Philippines, Hong Kong, Taiwan, Viet-Nam, Cambodia, Laos, Thailand, Malaya, and Singapore. Hamlin was most recently executive development advisor, in charge of the company's executive development program. He will continue to make his headquarters in White Plains, N. Y.

PORTER L. VERSFELT, JR., has been named chief geologist of Reservoir Analysts, Dallas petroleum engineering and geological consulting firm. He will head the company's newly created Tulsa office. Versfelt has been associated with Alex McCoy Associates in Tulsa, and with Texaco Inc. in Midland.

ARTHUR W. WINTER is the new vice-president of Great Northern Oil Co., St. Paul, Minn. Winter, with Great Northern since 1957, was formerly assistant to the president of the company. He has also served as president of Roosevelt Oil & Refining Co., Mt. Pleasant, Mich.

J. W. MEEHAN is the new president of the Derby Refining Co. Division of Colorado Oil & Gas Corp., Denver. Meehan was formerly Derby's executive vice-president and general manager. He joined Derby in 1957, after executive assignments in the crude oil supply and transportation divisions of Pure Oil Co., in Chicago. **F. O. Griffin** is a new vice-president of Colorado. He will continue as assistant to the president, and will be in charge of the company's financial affairs. Griffin joined Colorado in March, after serving as vice-president and treasurer of Western Nuclear Corp., Rawlins, Wyo.

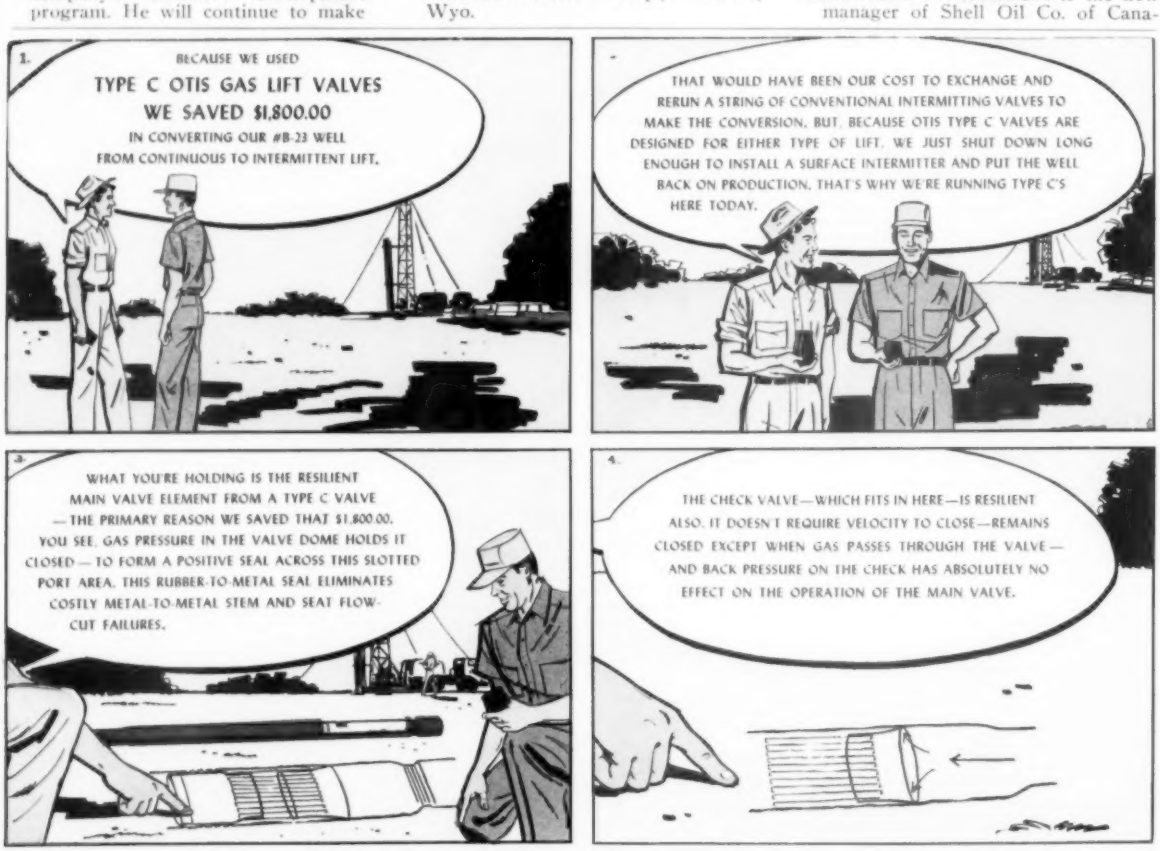
HARRY H. YOUNG has been named vice-president and general sales manager of Sinclair Refining Co.'s central region, with headquarters in Chicago. He succeeds the late **W. D. Cross, Jr.** Young, who joined the company in 1931 as a service station attendant, was most recently manager of Sinclair's Great Lakes marketing region.

H. H. Young

H. F. van der Voort

H. F. van der VOORT has been promoted to manager of marketing for Continental Oil Co.'s Rocky Mountain region, with headquarters in Denver. He succeeds **L. R. Kump,** who recently transferred to Houston as coordinator of marketing trade relations. Van der Voort was formerly marketing operations manager at Denver, and was most recently on special assignment at Houston.

LEONARD T. WILSON is the new manager of Shell Oil Co. of Cana-


1.
BECAUSE WE USED
TYPE C OTIS GAS LIFT VALVES
WE SAVED $1,800.00
IN CONVERTING OUR #B-23 WELL
FROM CONTINUOUS TO INTERMITTENT LIFT.
THAT WOULD HAVE BEEN OUR COST TO EXCHANGE AND RERUN A STRING OF CONVENTIONAL INTERMITTING VALVES TO MAKE THE CONVERSION. BUT, BECAUSE OTIS TYPE C VALVES ARE DESIGNED FOR EITHER TYPE OF LIFT, WE JUST SHUT DOWN LONG ENOUGH TO INSTALL A SURFACE INTERMITTER AND PUT THE WELL BACK ON PRODUCTION. THAT'S WHY WE'RE RUNNING TYPE C'S HERE TODAY.
3.
WHAT YOU'RE HOLDING IS THE RESILIENT MAIN VALVE ELEMENT FROM A TYPE C VALVE — THE PRIMARY REASON WE SAVED THAT $1,800.00. YOU SEE, GAS PRESSURE IN THE VALVE DOME HOLDS IT CLOSED — TO FORM A POSITIVE SEAL ACROSS THIS SLOTTED PORT AREA. THIS RUBBER-TO-METAL SEAL ELIMINATES COSTLY METAL-TO-METAL STEM AND SEAT FLOW-CUT FAILURES.
4.
THE CHECK VALVE—WHICH FITS IN HERE—IS RESILIENT ALSO. IT DOESN'T REQUIRE VELOCITY TO CLOSE—REMAINS CLOSED EXCEPT WHEN GAS PASSES THROUGH THE VALVE—AND BACK PRESSURE ON THE CHECK HAS ABSOLUTELY NO EFFECT ON THE OPERATION OF THE MAIN VALVE.

da's Montreal East refinery. He succeeds **J. L. Miller,** who is retiring. Wilson was most recently director of refining and supplies with Compania Shell de Venezuela. Before that, he was manager of the refinery he is now returning to.

W. H. HUDSON, president of Beaver Lodge Oil Corp., Dallas, which was recently acquired by Stekoll Petroleum Corp., Dallas, has been named a Stekoll director. Three other former Beaver Lodge directors who are now Stekoll directors are: **Thomas R. Harnett,** Dallas; **Eugene V. Klein,** Sherman Oaks, Calif.; and **Burt Kleiner,** Beverly Hills, Calif.

GEORGE WOODING CLARKE, vice-president, a director, and division manager of Pan American Petroleum Corp., in Oklahoma City, received the 1959 Distinguished Achievement Medal from the Colorado School of Mines. Clarke graduated from Colorado in 1923 as an engineer of mines. Four other alumni also received 1959 Distinguished Achievement Medals. "The medal is the highest honor which the school bestows on a graduate, and is equivalent to the honorary doctor of engineering degree."

S. M. BATTERSON has been elected president of Macmillian Petroleum Corp., Los Angeles. He succeeds **R. S. Macmillian,** who is taking a leave of absence due to illness. Batterson was formerly vice-president of the company. At the same time, **Donald H. McKee** was elected a director. He is managing partner of McKee & Co., investment bankers, Los Angeles.

H. J. GRUY has assumed the presidency of H. J. Gruy & Associates, Inc., following the incorporation of the Dallas-based geological and engineering consulting firm. Other officers of the company are: **Irene Haskett, C. M. Netherland,** and **Arthur Wessely,** vice-presidents; and **William K. Horn,** secretary-treasurer.

GEORGE C. HARDIN, JR., has been promoted to general manager of the Michel T. Halbouty oil and gas activities. He has been exploration, land, and production manager of the Halbouty firm since 1954. **Thomas D. Barber** has joined Halbouty as manager of exploration, supervising all geological, geophyscial, and land matters. Barber was most recently assistant division exploration superintendent for Pan American Petroleum Corp., in Houston. Hardin and Barber will be headquartered in Houston.

W. L. Hodges

A. Woerheide

R. M. Hawkins

W. L. HODGES, ART WOERHEIDE, and **RONALD M. HAWKINS** have been promoted to vice-presidents of Stekoll Petroleum Corp., Dallas. Hodges, who is vice-president in charge of production, was most recently general field superintendent for Stekoll's production in Kansas, Texas, and Canada. Woerheide, vice-president in charge of engineering, joined Stekoll in 1957 as chief engineer. Hawkins, with Stekoll since early this year, is vice-president of finance. He was formerly associated with Dallas Rupe & Son, Dallas investment bankers.

5.
HERE, TAKE A LOOK AT THIS TYPE C VALVE. THERE ARE NO METAL MOVING PARTS—NO SEATS TO CUT OUT. IT'S FULL-OPENING — COLLAR-DIAMETER — AND CONCENTRIC DESIGN. THESE LAST THREE FEATURES MAKE IT THE ONLY FULL-OPENING VALVE THAT LETS YOU ROTATE TUBING IN A DUAL-COMPLETION, IF IT BECOMES NECESSARY.
6.
AND THIS IS A TYPE F VALVE. IT'S OTIS' RETRIEVABLE VALVE FOR SIDE-POCKET MANDREL INSTALLATION. THE TYPE F OPERATES ON THE SAME PRINCIPLE AS THE TYPE C. BOTH HAVE THE LARGEST PORT AREA OF ANY VALVE OF THEIR SIZE ON THE MARKET — ANOTHER FEATURE WE PARTICULARLY LIKE.
7.
THE LARGE PORTS AND FAST ACTION OF THESE OTIS VALVES GIVE US MORE EFFICIENT USE OF OUR GAS — HELP REDUCE SLIPPAGE, SAY, WHY DON'T YOU TALK TO THIS OTIS GAS LIFT SPECIALIST ABOUT YOUR GAS LIFT PROBLEMS. I THINK HE CAN SHOW YOU HOW HIS VALVES WILL HELP YOU SAVE MONEY.
8.
MY COMPANY RUNS OTIS GAS LIFT VALVES BECAUSE THEY HELP US REDUCE PRODUCTION COSTS — JUST AS IN THE CASE OF OUR #B-23. IF YOU DON'T KNOW ALL OF THE DESIGN ADVANTAGES OF OTIS GAS LIFT VALVES, I SUGGEST YOU CALL THEIR NEAREST OFFICE TODAY. GIVE YOUR WELLS A NEW LIFT — RUN OTIS GAS LIFT VALVES!
OTIS - "First in Gas Lift Control"
OTIS
OTIS ENGINEERING CORPORATION
General Offices: 6812 Denton Drive · Dallas
Branches Throughout the Oil Country

How to get a bigger share of the diesel market

Formulate superior diesel fuels using DuPont FOA-2 to reduce filter plugging

When you add Du Pont Fuel Oil Additive No. 2 to your lower grade stocks, you cut down the rate of sludge formation and greatly improve the fuel.

This is because FOA-2 is an excellent dispersant and solubilizer. It reduces the size of insoluble residue particles. The tiny particles can then flow through the system and burn with the oil. Consequently, filter-clogging and injector-sticking are greatly reduced.

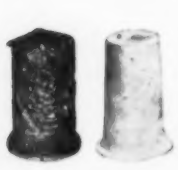
Performance tests have demonstrated the effectiveness of FOA-2. For example, in one test with a heavy cycle stock treated with FOA-2, the engines ran for 35 days without changing filters and without appreciable pressure drop. Without FOA-2, the filters became blocked in one week.

FOA-2 not only cuts sludge formation, it often cleans parts where sludge has begun to build up.

Being ashless, FOA-2 does not contribute to exhaust stack sparking.

Because of its many outstanding advantages, Du Pont FOA-2 is now being widely and successfully used by many oil companies in the diesel fuels supplied to the nation's leading railroads.

Your Du Pont representative can fill you in with further details. Or you can write for more information to E. I. du Pont de Nemours & Co. (Inc.), Petroleum Chemicals Division, Wilmington 98, Delaware.



Better filterability of FOA-2 treated fuel is shown here. The filter at the left was clogged in a week's use of untreated economy fuel. The clean filter at the right was used several weeks in an economy fuel with FOA-2 added.

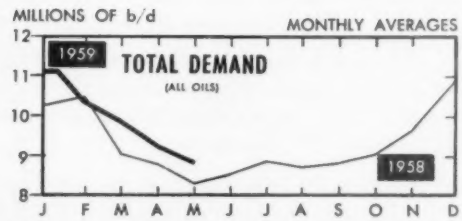
DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

Tetraethyl Lead
and other
Petroleum Additives

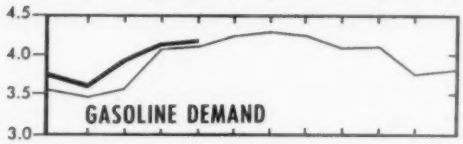
PETROLEUM WEEK'S

Fingertip Figures



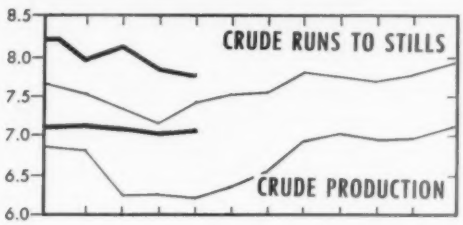
TOTAL DEMAND

Latest 4-week average	8.907
Year ago	8.251



GASOLINE DEMAND

Latest 4-week average	4.373
Year ago	4.179

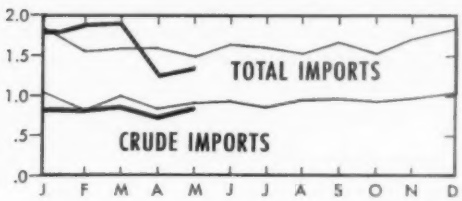


RUNS TO STILLS

Latest week	8.020
Previous week	8.204
Year ago	7.659

CRUDE PRODUCTION

Latest week	7.010
Previous week	7.037
Year ago	6.335

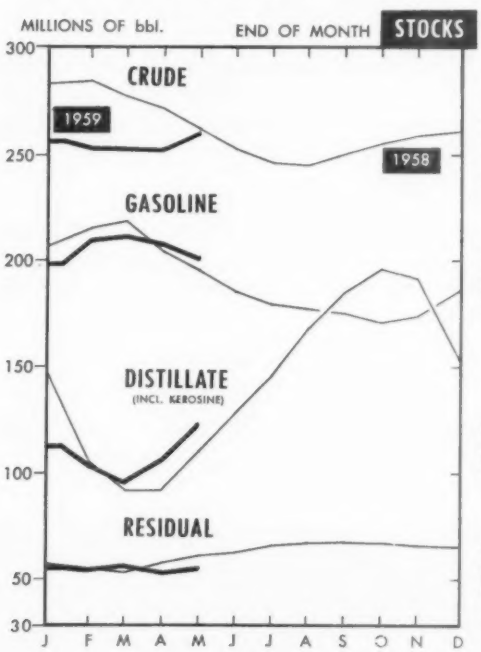


TOTAL IMPORTS

Latest week	1.218
Previous week	1.384
Year ago	1.504

CRUDE IMPORTS

Latest week	.875
Previous week	.857
Year ago	.926



CRUDE STOCKS

Week-ended 6-6	261.7
Previous week	262.5
Year ago	263.6

GASOLINE

Latest week	201.6
Previous week	203.6
Year ago	190.2

DISTILLATES

Latest week	132.7
Previous week	127.5
Year ago	119.7

RESIDUAL

Latest week	54.6
Previous week	55.6
Year ago	63.4

Refiners eased up on refinery runs last week—but not much. Total runs were still over 8-million b/d, only 184,000 b/d below the previous week's revised figure of 8,204,000 b/d.

Last week's total runs of 8,020,000 b/d were still much higher than the 7,888,000 b/d level of the end of May.

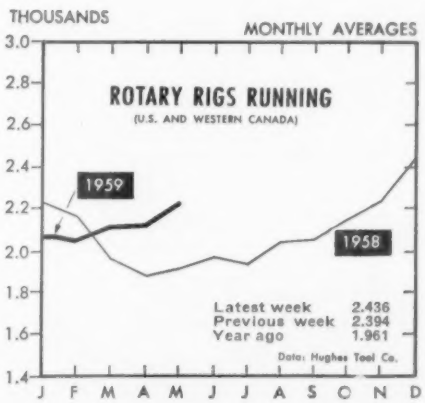
A rise in gasoline demand last week and a slight cutback in output combined to reduce stocks by 2-million bbl.—the greatest weekly reduction this year.

After a contraseasonal increase in stocks two weeks ago, last week's decline to 201-million bbl. of gasoline inventory is a promising sign. But gasoline stocks are still high compared to last year's level of 190.2-million bbl. The result is that gasoline prices are still weak, at a time when increased demand should be encouraging firmness in the price structure.

The build-up in distillates stocks of 5.1-million bbl. last week pushed inventories to 132.7-million bbl., up 13-million bbl. over a year ago.

Compared to last year, refiners are almost a month ahead of schedule on distillates: Last year, distillate stocks did not reach 132-million bbl. until early July.

The one favorable area in stocks remains in residual fuel oil. Last week stocks continued to decline, and now stand at 54,612,000 bbl.—down 1-million bbl. from a week before, and 8.8-million bbl. below the level at this time last year.



The Market Trend

Things Are Optimistic at the Lower Level

The hope among refiners is that the bottom has been reached. The independents, particularly, are just about on the ropes after three solid months of price declines.

For if prices at the refinery slide much lower, it will take more than mandatory import controls to protect the general level of crude. One Gulf Coast refiner estimated last week that he now is losing 20¢ a barrel on every barrel he runs. Therein lies the hope of a correction.

Discounts at the Gulf didn't abate much this week, but they haven't increased, either. If you can believe the refiners, they now see the futility of quoting product at "something off somebody else." That road leads only to declines.

And prices at the refinery now are low enough that some operators may cut runs and buy on the outside to cover their requirements. This could stem the fall in No. 2 prices to something close to 8¢ at the Gulf. The sale of half a dozen cargoes of gasoline, too, could start the pendulum in the other direction.

Some signs of firming developed along the Great Lakes Pipe Line last week. Spot discounts off 11.5¢ for regular-grade gasoline tended to dry up in Oklahoma. If the Mid-Continent shapes up, the pressure would be off at mid-Mississippi terminal points. This, in turn, would help the upper Gulf Coast.

And rising ocean freight rates may drive East Coast buyers into the Gulf market. The U.S.-flag tanker market is quite thin right now. A fair number of vessels are out on the West Coast. The military keeps cutting into the supply. If a rise in U.S.-flag rates looks imminent, you will see some early distillate buying at the Gulf this summer.

One thing seems certain: Everybody wants a change.

Two-Way Street: The zaniest trades this week are the cargoes slated for the tanker **Sheldon Clark.** It will carry a cargo of gasoline from the Gulf to the West Coast in late June. Then, the same vessel will pick up a cargo of gasoline on the West Coast to return to the East Coast in mid-July.

No. 6 Offer: The toughest bid this week was $2.09 a bbl., offered to the City of New York, for delivery by barge to Goldwater Memorial Hospital. This price is exactly the same as the New York contract delivery cargo price; the cost of barging figures about 10¢.

Jet Fuel Award: Note from Italy: Mobiloil Italiana will supply about 500,000 bbl. of JP-4 fuel to the military for one year beginning July. The price is 6.25¢, f.o.b. Naples. The fuel will be used in Libya.

De Blois Switches Supply Source: De Blois Oil Co., a large distributor in Rhode Island, is switching flags, from Esso to Texaco, on June 21. This marks the company's first change of supplier in 27 years.

De Blois retails gasoline through 50 service stations, and sells fuel oil to about 5,000 home accounts.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of June 15

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U. S. Gulf Coast, cargoes
- Gasoline, 98 oct prem 11.375-13
- Gasoline, 92 oct reg 10.25-11.5
- Kerosine 8.75-10
- **Heating oil, No. 2 ..... 8.25-9.375↓**
- Gas oil, 48-52 d.i. 8.5-10.125
- Fuel oil, bunker "C" $2.00-2.10

Caribbean, cargoes
- Avgas, Grade 100/130 ..... 15.25
- **Gasoline, 93 oct research prem ..... 10.75↓**
- **Gasoline, 87 oct research reg ..... 9.875↓**
- Gasoline, 79 oct research 9.125
- Gasoline, 70-72 oct motor method 9
- **Kerosine ..... 9↓**
- **Heating oil, No. 2 ..... 8.25↓**
- **Gas oil, 48-52, d.i. ..... 8.5↓**
- Fuel oil, bunker "C" $2.00

New York Harbor, barges
- **Kerosine ..... 9.65-9.9↓**
- **Heating oil, No. 2 ..... 9.15↓-9.4↓**
- Fuel oil, No. 6 ..... $2.37

Okla-Group 3, northern shpt., bulk
- Gasoline, 89 oct reg 11.5-12.25
- **Kerosine ..... 9.75↓-10.25**
- **Heating oil, No. 2 ..... 8.75-9↓**
- Fuel oil, No. 6 ..... $1.60-1.80

Chicago, bulk
- Gasoline, 91 oct reg 11.5-11.75
- **Heating oil, No. 2 ..... 9.5-10.85↓**
- Fuel oil, No. 6 high sulfur 7.4-7.5

Los Angeles, rack
- Gasoline, 88 oct reg 12-12.65
- Diesel fuel, PS 200 ..... 8.5-11.25
- Light fuel, PS 300 ..... $2.80
- Heavy fuel, PS 400 ..... $2.15-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3 ..... 4.5
- FOB Breckenridge, Tex. 4

LP-Gas
- Propane, Oklahoma (Group 3) 4
- Propane, Baton Rouge 4.625-5

Pennsylvania Lubes
- Bright stock, 25 p.t. 22
- 200 vis. neutral, 25 p.t. 21

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent 95 v.i. 23-24
- Neutral, solvent, 200-210 vis 19.5-20.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i. 24
- Neutral, solvent, 200 vis 20.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130 ..... 17.25
- Gasoline, 79 oct research 9.75
- Kerosine 10.75
- **Gas oil, 48 d.i. minimum ..... 10.125↓**

KEY PRICES—CRUDE OIL

(2¢ differential per deg., of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9 ..... $2.77-2.97
- North Dakota, 36.0-36.9 ..... 2.62-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9 ..... 3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9 ..... 2.92-3.22
  - West Texas, sweet, 36.0-36.9 ..... 3.00
  - West Texas, N. M., inter., 36.0-36.9 ..... 2.93
  - West Texas, N. M., sour, 32.0-32.9 ..... 2.71
  - East Texas, flat 3.25
  - Mirando, 28.0-28.9 ..... 3.31
- Illinois Basin, flat 3.00
- Pennsylvania Grade, Bradford dist., flat 4.25
- California, Signal Hill, 21.0-21.9 ..... 2.50-2.54†
- North Louisiana-Arkansas, 36.0-36.9 ..... 2.77-3.02
- Wyoming, sweet, 36.0-36.9 ..... 2.85-2.90
- Wyoming, sour, 32.0-32.9 ..... 2.63-2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.) $2.47
- Leduc-Woodbend (Alta.) 2.53
- Redwater (Alta.) 2.42
- Daly (Man.) 2.21
- Smiley (Sask.) 2.18

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 47.0-47.9, Tucupido $3.34
- San Joaquin, 41.0-41.9, Puerto la Cruz 3.10
- Oficina, 35.0-35.9, Puerto la Cruz 2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay 2.30
- Bachaquero, flat, Las Piedras 1.73-1.88
- Tarra, 38.0-38.9, San Lorenzo 2.83
- Lagunillas Heavy, flat, Cardon 2.10

**Differential per deg. of grav. varies.*

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura $1.89-1.90
- Safaniya, 27.0-27.9, Ras Tanura 1.50
- Iran, 34.0-34.9, Bandar Mashur 1.86-2.04
- Iran, 34.0-34.9, Abadan 1.81
- Iraq, 35.0-35.9, Fao 1.80
- Kuwait, 31.0-31.9, Mina-al-Ahmadi 1.67
- Qatar, 41.0-41.9, Umm Said 2.05
- Neutral Zone, Burghan, 23.5-24.4, Mina Saud 1.51
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud 1.38

Middle East, Eastern Mediterranean
- Arabian, 34.0-34.9, Sidon $2.27
- Iraqi, 36.0-36.9, Tripoli, Banias 2.31

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, flat $2.57

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- U. S. Gulf-New York, clean ..... (USMC)—22½%) $2.21
- U. S. Gulf-New York, dirty ..... (USMC—35%) $1.85
- **NWI-USNH, dirty ..... (USMC—60%) $1.10↑**
- NWI-UK/Cont., dirty ..... (Scale—30%) 22/9*
- Persian Gulf-UK/Cont., dirty ..... (Scale—70%) 20/10*
- Persian Gulf-USNH, dirty ..... (USMC—75%) $3.18

**Sterling*

DEPT/Service & Equipment Companies

JOHN C. HELIES is the new president of the Security Engineering Division, one of the Dresser Industries. He was formerly executive vice-president and general manager. Before joining Dresser in 1955, Helies was general manager of the appliance control department of General Electric Co. Helies will continue to be located at the division's headquarters in Dallas.

L. B. Swan

J. C. Helies

L. B. SWAN, vice-president and a director of the Dowell Division of Dow Chemical Co., now heads all of Dowell's foreign activities from the Houston office. He was formerly manager of United Oilwell Service, S.A., a Dowell subsidiary in Venezuela, which recently transferred its assets and business to the Dowell Division of Dow Chemical International Ltd., S. A. **Tromer R. Smith**, general manager of United for the past five years, transfers from Venezuela to Houston, where he will be general manager of foreign operations for Dowell. **Joe L. Thompson**, who has been with United for the past five years, now serves as resident manager for Dowell at Caracas. **G. T. Lamberson**, most recently with United at Maracaibo, is now located in Argentina as resident manager. Dowell services in Argentina are offered by the Dowell Division of Dow Quimica of Argentina, S.A.

SCHLUMBERGER WELL SURVEYING CORP. has announced promotions and changes affecting its location managers, and the appointment of new sales engineers. **H. H. Ham** becomes location manager in Laurel, Miss., and **T. W. Cobb** succeeds him as manager in Venice, La. **L. A. Brasuell**, formerly location manager in Wichita, Kan., transfers to Hays, Kan., and **J. D. Austin**, formerly location manager in Great Bend, Kan., transfers to Evansville, Ind. **R. S. Judson**, formerly senior sales engineer in the Gulf Coast division, is the new location manager in Wharton, Tex., and **R. M. Porter** is the new manager in Kenmare, N. D. Five new sales engineers are: **W. R. Laws**, Midland, Tex.; **R. R. Vann**, Hobbs, N. M.; **F. E. Kendrick**, formerly sales engineer in Shreveport, now in Laurel, Miss.; **B. E. Davis**, Cushing, Okla.; and **J. D. Cunningham**, formerly sales engineer in Gretna, La., now in Venice. **R. C. Cantrell** has been promoted to senior engineer in New Orleans, and **J. A. Gilreath** to senior engineer in Jackson, Miss.

LOREN ASHLEY is in charge of McCullough Tool Co.'s newly created district office at Williston, North Dakota. He was formerly sales representative for McCullough at Sterling, Colo. **Bill Newashe** is assistant manager of the new district. **Olin McGrew** is the new district sales and service manager at Farmington, N. M. He was formerly sales representative there. **Newton H. Ottinger**, assistant division manager, logging and sales promotion, in the Mountain division, moves from Durango, Colo., to Denver. Ottinger is a specialist in the interpretation of radiation logs.

A. E. Plomp

R. E. Dunn

ROBERT E. DUNN has been promoted to assistant to the general manager of sales for Cardwell Mfg. Co., Wichita, Kan., and **A. E. (Dutch) PLOMP** to general manager of Cardwell Mfg. Co. Ltd. of Canada, in Calgary. Dunn has been merchandising manager for Cardwell since he joined the company last year. Before that, he was associated with Mid-Continent Supply Co. Plomp, who joined Cardwell last year, was most recently Canadian sales representative.

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PETROLEUM WEEK REPRESENTATIVES

Atlanta 3 — Douglas C. Billian
1301 Rhodes-Haverty Bldg.
Jackson 3-6951

Boston 6 — Donald R. Thompson
350 Park Square Bldg.
Hubbard 2-7160

Chicago 11 — Edward A. Callahan Jr.
H. Sherman Davis
520 North Michigan Avenue
Mohawk 4-5800

Cleveland 15 — J. E. MacArthur
1164 Illuminating Bldg.
55 Public Square
Superior 1-7000

Denver 2 — J. W. Patten
Mile High Center, 1740 Broadway
Alpine 5-2981

Houston 25 — D. O. Hanson
724 Prudential Bldg.
Jackson 6-1281

Los Angeles — Peter S. Carberry
1125 W. Sixth St.
Huntley 2-5450

New York 36 — Donald R. Thompson
500 Fifth Ave.
Oxford 5-5959

Philadelphia 3 — W. A. Potter
6 Penn Center Plaza
Locust 8-4330

San Francisco 4 — William C. Woolston
69 Post Street
Douglas 2-4600

Tulsa 3 — J. A. Hartley
909 Enterprise Bldg.
522 South Boston
Gibson 7-5594

England, London E. C. 4 — E. E. Schirmer
McGraw-Hill Co., Ltd.
95 Farrington St.

EDWARD SYMONDS has joined the petroleum department of the First National City Bank of New York. He will direct the economic activities of that department. Symonds was most recently associated with the International Bank for Reconstruction & Development. From 1949 to 1953, he was located in London as deputy editor of the Petroleum Press Service, and as information officer for Mobil Oil Co., Ltd.

E. Symonds

J. Terrell

JOE TERRELL has been named sales engineer for Stewart & Stevenson Services, Inc., Houston. He will specialize in oil field service equipment. He was most recently chief engineer of Baash-Ross Tool Co., division of Joy Mfg. Co.

ARTHUR JOSEPH de la HOUSSAYE has been appointed superintendent of production for the oil field equipment division of Delta Tank Mfg. Co., Baton Rouge, La. He joins Delta after experience with several steel equipment companies, where he held various positions ranging from field engineer to district manager.

HOWARD D. HARTOUGH has been elected president of the chemical products division of Chemetron Corp. For the present, Hartough will be located in Louisville, Ky., where he will supervise the operations of the division, which includes Crestwood Chemical Co., Dunham Chemical Co., Girdler Catalysts, and Holland Color & Chemical Co. Hartough was most recently general manager of Girdler Catalysts, in Louisville.

ROBERT G. HARGROVE has joined Badger Mfg. Co., Cambridge, Mass., as a project engineer. He has been associated with Socony Mobil Oil Co. as assistant project engineer, maintenance engineer, and supervisor of maintenance engineering, and most recently as assistant manager of the engineering division.

KENNETH F. WILLIAMSON has been named assistant sales manager of Grove Valve & Regulator Co., with headquarters in the company's Oakland (Calif.) offices. Prior to joining Grove, Williamson was associated with W-K-M, a division of ACF Industries, Inc.

B. R. DICKSON is manager of new division offices recently opened in Denver by Johnson Testers, Inc. The Denver office will handle Johnson's operations in the Rocky Mountain states, California, Kansas, Oklahoma, and North Texas. Other Johnson employees assigned to Denver are: **J. J. Dunn, Jr.**, staff assistant; **Wayne Gorrell**, senior salesman; **Harry Crumley**, credit manager; **Tom Korman**, clerk; and **Lee Sodar**, secretary.

EARL M. CHRISTENSEN has been appointed sales representative of the precision fittings division of Alberta Oil Tool Co. Ltd., Edmonton. He was formerly associated with Continental-Emsco Co. Ltd.

E. M. Christensen

M. C. Tomlinson

MAX C. TOMLINSON has joined Technical Oil Tool Corp. as service representative in the Hobbs (N.M.) area. He will work under **Rudy Harralson**, area manager at Hobbs.

VICTOR E. SIMON has been appointed southwest district traffic manager of National Supply Co., with offices in Dallas. He will be in charge of all traffic and transportation functions for the company's midwest, southwest, and Gulf Coast divisions, the Gainesville and Houston plants, and movements of tubular products from storage yards. Simon started with the company in 1943 in the traffic department of the Toledo (Ohio) plant. He has been division traffic manager in Ft. Worth since 1948.

BEN SLOAT has been appointed southwest oil field sales engineer for Hagan Chemicals & Controls, Inc., and its divisions, Calgon Co. and Bradford Laboratories. Sloat will be headquartered in Tulsa. He was formerly a products engineer in Hagan's administrative and research center in Pittsburgh, where he was concerned with oil field water problems, especially situations related to secondary recovery waterflood projects.

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Easiest way to file and find confidential maps, tracings, blueprints. Quality metal cabinet file with locking doors. 112 tilting tubes handle 60" prints. Tubes indexed for quick location. Ideal for field and home offices. Shipped from stock.

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EQUIPMENT & BUSINESS OPPORTUNITY advertising $16.75 per inch.
EMPLOYMENT OPPORTUNITIES — $28.00 per inch, subject to Agency Commission.

UNDISPLAYED RATE
(Not available for equipment advertising)
$1.80 a line, minimum 3 lines.
POSITIONS WANTED undisplayed rate is one-half of above rate, payable in advance.
Box Numbers—Count as one line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

CHIEF ENGINEER
PRODUCTS TERMINALS AND PIPELINES

WANTED: Experienced engineer capable of establishing and supervising engineering department for construction of petroleum products terminals and products pipelines, including complete design, issuance of quotation requests and material authorizations, supervision of construction engineers and approval of subcontractors' designs. Must be able to provide preliminary design rapidly and estimate construction costs accurately enough to provide basis for competitive bids. Must have field experience in design and construction of terminals and pipeline including hydraulic, electrical, civil and mechanical design, and have mental capability of working for non-engineer. Will be located in Southwest. Some travel required. Will guarantee three years employment $20,000 year, if ability proven by performance. Send resume including references to

P-1825, PETROLEUM WEEK
520 N. Michigan Ave., Chicago 11, Ill.

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Long established, sound firm, annual gallonage over 20 millions, **seeks cooperation with progressive American Oil Company,** who intends to invade European markets.

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500,000 FT 10¾" 40#
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All machine cleaned, straight, plain end, seated. Strickley No. 1. Pittsburgh Test. Lab. report furnished. Indiana-Ohio Pipe Co. P.O. Box 828, Phone 34674, Decatur, Ind.

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Experienced sales manager of refined petroleum products. Excellent background of successful sales both in field and as supervisor of eighteen sales offices. Desire position with progressive oil company. PW-1934, Petroleum Week.

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What Drake Brought to Titusville

THE PETROLEUM INDUSTRY'S most valuable asset will be at Titusville, Pa., on Aug. 27. Although it will be invisible to the 1,000 oil men who will attend the oil centennial ceremonies, it will have as real a part in the proceedings as the implements Col. Edwin L. Drake used to bring in the country's first well drilled for oil.

Oil's greatest asset has always been the character of men. Throughout the expansion of petroleum in many directions over the earth, there runs an impelling drive to get things done, a willingness to take big risks for a possible big gain—rather than to settle for slower, safer progress. Far more than men in other industries, oil men have insisted on trying new ways of doing things.

The result has been the discovery of the world's huge oil reservoirs miles underground, the processing of millions of barrels of oil a day, and the delivery of products to distant shores of the world for pennies a gallon. Because of the energy and initiative of oil men, the industry is successful far beyond the dreams of oil men even a few years ago.

TODAY, HOWEVER, the industry is changing. The Titusville celebration this year almost coincidentally comes in the middle of a transition period when the rush of technology is forcing oil companies to consider new tools, new management techniques, and new organizational structures.

Already apparent is a lessening of the importance of the individual oil man, as business variables grow in complexity, and as more emphasis is placed on "optimized" efficiency. Despite the efforts of some companies to give men down the line more real authority, there is a growing tendency for the individual to let "the company" make decisions.

Management is affected, too. As companies expand to giant size, the financial stakes are growing bigger, and the penalty of failure heavier. Narrowing margins are causing managements to become more cautious about expenditures. The tendency is to let the other companies take the chances.

This is a good way to fail.

THE RECORD OF PETROLEUM from Titusville to the present contains the names of few companies or men who waited for someone else to take the lead. The companies that today are pressing ahead with new and seemingly radical programs are the ones that are building the know-how and confidence that will produce strength for tomorrow.

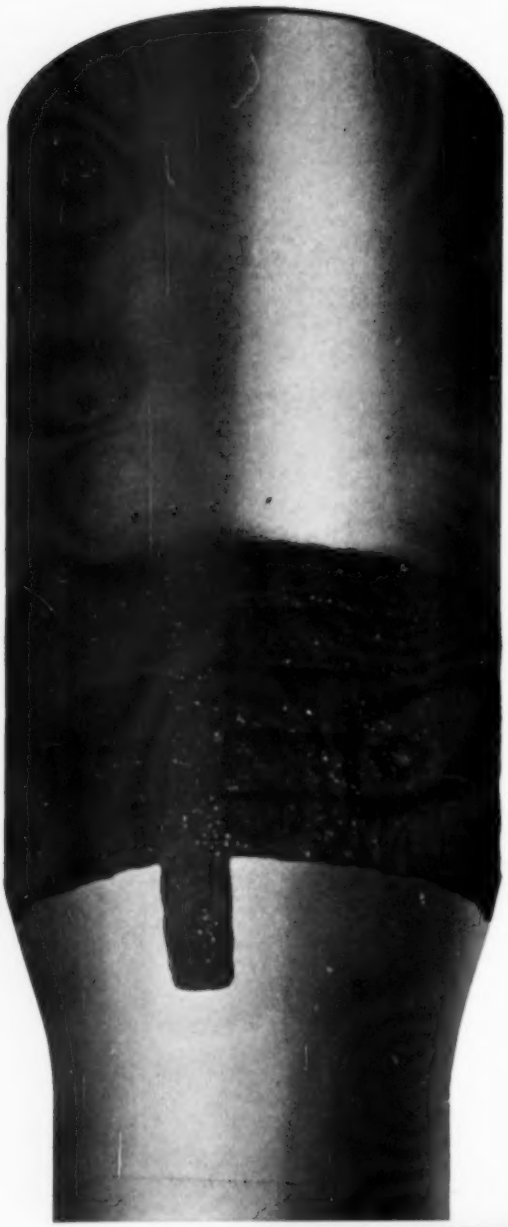
The day of the primitive tools used by Col. Drake is gone forever. But it was the pioneer's spirit that he really brought to Titusville. The payout for that is only beginning.

"Calling the Signals...for Safety"

Safety on the job begins with the men you see here, "huddled" to plan every move and action they will take in executing their individual tasks. Checking and re-checking details of the job to be performed, with every man knowing exactly what is expected of him... when, where, and how... leads to the type of teamwork that makes *safety a reality*. When the "play is called" on your job, every Halliburton man is prepared to follow the safety rules that lead to better performance, and better results. For safety on your next job... let Halliburton "Call the Signals."

HALLIBURTON OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA



Hughes FLASH-WELD is now 21

At 21, Hughes "Flash-Weld" is the most experienced welded tool joint-to-pipe connection in the oil fields.

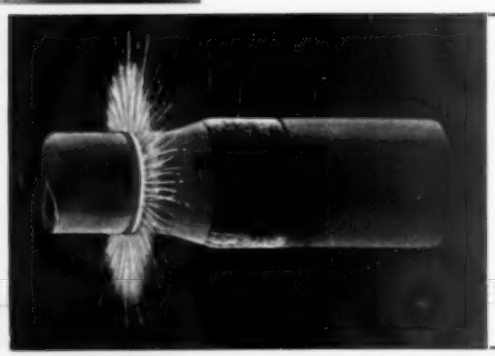
Since 1938, when Hughes introduced the first flash-welded drill string, *more than 40 million feet* of drill pipe have been unitized by the "Flash-Weld" process.

A new heat treating process has *more than doubled* the tension impact strength of "Flash-Weld" pipe connections. And new processing controls are improving the quality of the finished drill strings.

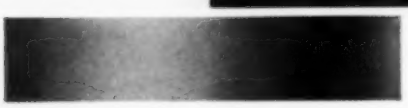
In addition to exacting physical tests, "Flash-Weld" tool joints and flash-welded connections undergo a series of critical inspections. For instance, after flash-welding, all weld areas are subjected to magnetic particle inspection. The critically-stressed areas of the tool joints themselves (this applies to all Hughes joints) are magnetically inspected. And the hardfacing on the joints is "snow" tested to check the bond of the hardfacing material to the joints.

The Hughes method of hardfacing, plus Hughes' specially developed tungsten carbide hardfacing material, assures maximum protection against wear during the life of the joints.

FLASH-WELD
A DEVELOPMENT
OF
HUGHES
TOOL COMPANY
HOUSTON, TEXAS



Complete line of "Flash-Weld" joints is available for attachment to new API LIGHTWEIGHT drill pipe, as well as standard weight pipe. Ask your Hughes man.



"Flash-Weld" joints are available with tapered and square shoulders